# Scientific American.

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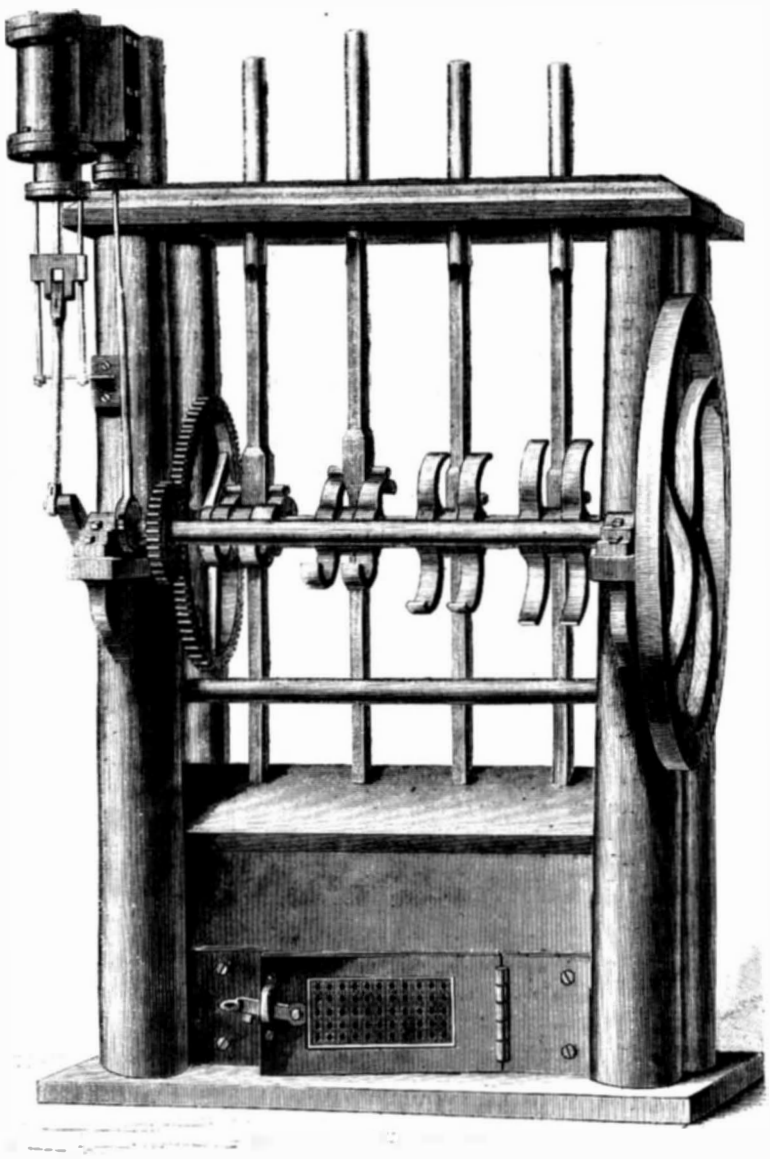
### Improved Portable Stamp Mill.

This convenient and even elegant stamp mill is one that will be appreciated by every one engaged in mining operations, more especially such as have been annoyed by the inconveniences attending the use of the old-fashioned mills. This machine recommends itself by reason of its perfect adaptation to the uses required of such mills, as it is always ready for work and requires no special building for its reception and operation. All of the stamps are within one frame, which is strongly braced, and always in line, so that with ordinarily decent usage it cannot fail to wear a long time. In the matter of repair this mill is exceedingly economical, and adjustments of any part, such as a defective or worn-out shoe, or the removal of heavy pieces of ore from the troughs below, can be performed without the necessity of stopping all the rest of the stamps, as is the case with the old-fashioned mills. We are assured by the inventor that with the old mills in use the fires under the boilers have to be drawn sometimes while such adjustment are in progress, thereby causing a great deal of needless expenditure of time. With this machine these annoyances do not exist, as the repairs may go on while the other stamps are running. The speed of the stamps can also be well regulated and is at all times under control. All costly buildings and frames for carrying the long lines of shafting used in the old mills are dispensed with here, and only a slight roof is required to protect the apparatus from the weather. This machine is the invention of Thos. Wise, of Chelsea, Mass., who manufactures and has the machines for sale. Further information can be had by addressing him at No. 80 Fourth street, as above.



WISE'S PORTABLE STAMP MILL.

### White Maple Sugar.

To make maple sugar white, the sap should be caught in a very clean vessel (tin is best), and boiled down in clean iron kettles, or tin, that the sirup may not be colored; strain into tin every night, set it in a cool place until you get enough to "sugar off." Let it settle one or two days; then drain it off, leaving the dregs, and to a pail of sirup add the white of one egg and five tablespoonfuls of milk, and one-twentieth of a teaspoonful of saleratus mixed well together. While boiling, add the above mixture, and stir well half a minute. Let it boil gradually till the scum rises; skim it off, boil down to the thickness of thin honey. After cooling a little, pour it into stone jars; let it stand open till cool, without stirring; cover it with a cloth, put on the cover, set it in a cool place, and let it remain six months or a year. It will crystallize on the sides and bottom. If the remainder sours, turn off the molasses into a kettle, add a little saleratus, boil and skim as before, and it will be sweet. Let it cool, and turn it into the jar. Open-mouthed jars should be used. Take out the crystallized sugar, rinse and dry it, and it will be as white as loaf sugar.—*Boston Cultivator.*

### Deafness cured by Compressed Air.

We find the following in *Le Moniteur Illustrè des Inventions* :—"The air coffer-dams which are of so powerful aid in hydraulic labors, will they be called upon to play an important *role* in therapeutics? We are disposed to believe so on reading the account of the effects produced on M. Leon Lefebvre-Durufle, cured of deafness during a visit which he made in the works of the tubular bridge which is being thrown across the Seine at Orival, in the neighborhood of Elbeuf.

"'I entered,' said he, 'into the inclosure in which is deposited the matter coming from the bottom of the water. This envelope receives, at certain moments, air compressed to two and a halfatmospheres. As soon as I was introduced into the inclosure, the door was shut, and the stop-cock was opened which communicates with the reservoir of compressed air. The air entered instantly, whistling with force. The walls of the chest, constructed of plates of iron a quarter of an inch in thickness, vibrated as if they were made of thin sheets of zinc. The noise was deafening even for a deaf person like me. I felt the tympanum of my ears stretched violently. Respiration failed me, and at each instant it was necessary to repel with energy the air which was forced into my nostrils. At the end of four or five minutes the equilibrium was re-established, and I was able to breathe without difficulty under the high pressure in which I was plunged.

"'But what was my astonishment! my deafness had totally ceased. I heard distinctly the voices of my companions, however low their tones, as well as the noise of the mortar which was operated fifty feet below me. I perceived also the ebullition of the water caused by the air which a steam engine constantly forced into the apparatus. When I return to the open air the phenomenon which had just operated in my organism continued, and I believed myself permanently cured. I communicated this strange result to the engineer, whom I found at my coming out. He informed me that one of his friends, deaf like myself, had entered a few days before into the diving-bell, and that the effects which I had experienced, and which I still experienced, had been the same for him. He added, however, that the deafness of his friend had returned four or five hours after. This also was my own experience, as my deafness returned in the evening."

"M. Lefebvre-Durufle reports afterward another fact:—

"'When the engineer attached to the labors of the tubular bridge was in the service of the contractor charged with the construction of the bridge of Kehl, on the Rhine, he had under his orders two men completely deaf, who were employed in the same kind of labors as those at the bridge of Orival, and who were consequently obliged to enter daily into the apparatus of compressed air. The first day these men were relieved of their deafness, but it returned in a few hours. The next day the relief continued longer, and at the end of thirty-six days they were permanently cured. Eighteen months afterward their deafness had not returned.'"

A CURIOUS trick of rifle-shooting was performed at Paris, the other day. A Swiss gentlemen backed himself to take aim with his carbine, then support it with his right arm, then with his left hand put his hat over the muzzle, and hit the centre of the target. This he did three times, and "landed" his money.

A SINGULAR discovery has been made in the Isle o Man, where it has been ascertained that certain old guns long used as posts on the quay at Peel, were rifled. Government has ordered them to be transferred to Woolwich, where they are to be preserved as the earliest specimens of rifled ordnance.

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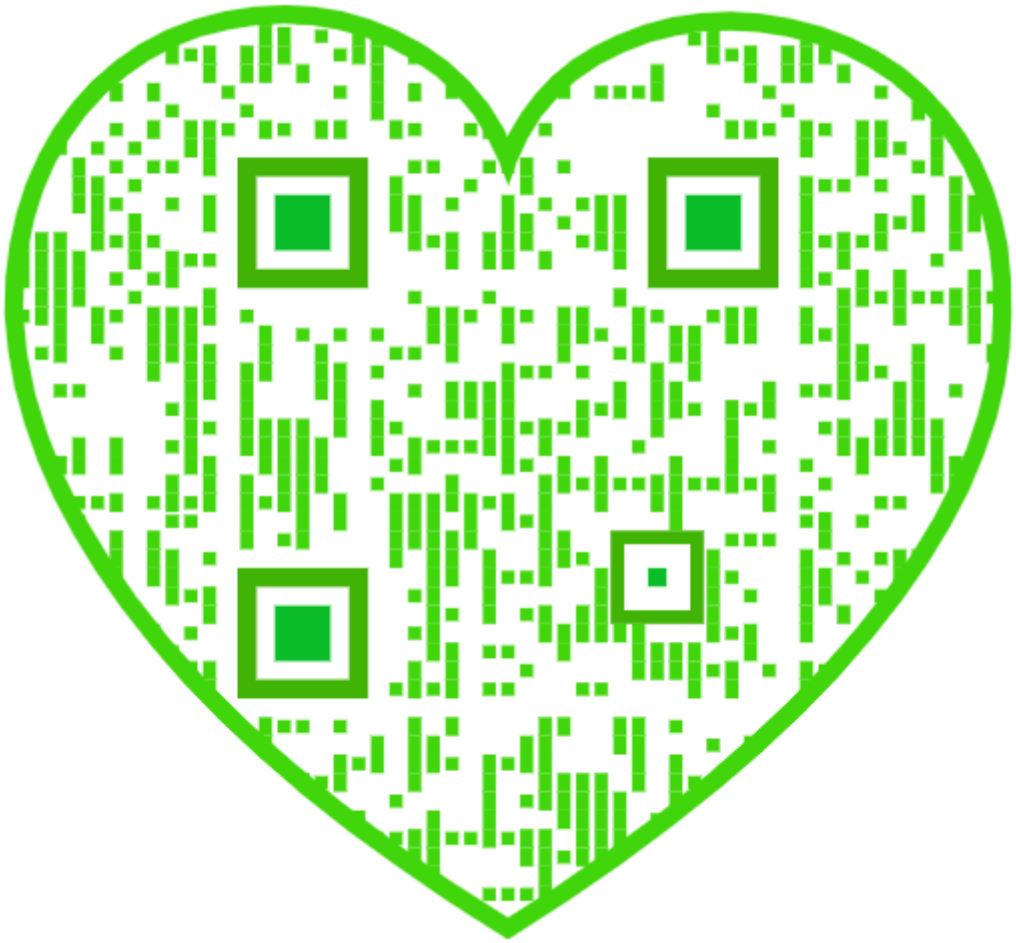

## THE MOST IMPORTANT AMERICAN DISCOVERIES AND INVENTIONS.

### No. 4.

### CUT NAILS.

### Wilkinsons and Others.

Among the appliances which have multiplied a thousand fold the power of man in molding the substances of nature into forms adapted to the gratification of his wants, there are few that rank higher in importance than the humble little instrument which is named at the head of this article. In numbers, nails far surpass any other thing which is employed in any of the arts, and the part that they play in the construction of our dwellings, ships, furniture and other fabrics is so great that, if they were annihilated, the whole order and movement of life would be changed.

In the old plan of making nails by hand, the end of the nail rod was heated, hammered down on an anvil into the required form, pointed, cut off and headed. In the neighborhood of Manchester alone, 60,000 persons were employed in this occupation, and great numbers in all other parts of the civilized world. By the present plan of cutting the nails, one steam engine drives several machines, and each machine makes a hundred nails per minute; the workman having nothing to do but to lay on the plates, and to put the finished nails into the kegs.

The saving of labor is also very great to those who use the nails. With the wrought nail it was necessary to bore a hole in most kinds of wood before the nail was driven; but the cut nail is so formed that it can be driven into the solid wood without danger of splitting. Probably five or ten cut nails are driven in the same time as one wrought nail. The cut nail, too, from two of its sides being parallel, and from the roughness of its edge, retains its hold more firmly in the wood.

The machinery for making cut nails is wholly of American invention, and is the result of a series of efforts by several different inventors. About the time of the close of the Revolutionary war, two brothers of the name of Wilkinson, who had iron-works in Cumberland, R. I., cut a lot of nails from some old barrel hoops—"Spanish hoops," as they were called; and these are supposed to have been the first cut nails ever made. The first patent for a nail-cutting machine was granted on the 23rd of March, 1794, to Josiah G. Person, of New York, and from that time to 1817, more than 100 patents were issued. In 1810, Albert Gallatin, Secretary of the Treasury, made an elaborate report on this subject, and he estimated that a million of dollars had then been expended in bringing nail-making machinery to perfection. The machines are now models of simplicity and effectiveness, and they release a vast number of hands to be employed in the production of wealth in other forms.

## The "Blind Men" in the London Post-office.

From an English publication, "The Leisure Hour," we obtain the following interesting description of the peculiar duties of the "blind men" in the General Post-office, London:—

"The table of the 'blind men' is the calmest spot in the building. Theirs is no work of mere mechanical dexterity, that can be brought by constant practice to a dazzling rapidity of execution. It requires much searching in directories, much guessing, much mental effort, to solve most of the riddles in writing and spelling that come upon the table. The irregular combinations of the alphabet alone present a boundless field of variety to the ignorant and the persevering; and when the combinations of Christian names and surnames, names of towns, and names of counties, as well as the forms of letters, and the parts of a letter's proper superscription, come to be added, arithmetic can hardly convey the result. It is to this table, that all those riddle letters find their way, upon whose surface Islington is spelled and written 'East Linton'; and the late Iron Duke is addressed, long after his death, as the 'Duk hor wellenton, Ip ark corner London englent, or hulswear.' The 'blind men' are often called upon to decipher such directions as the following, conveyed in the most undecided of handwritings: 'To Mrs. Slater to the Prince of Wales in fits Roy place Kinteston London paid.' The 'blind men' decide that this means the 'Prince of Wales's public house, Fitzroy Place, Kentish Town;' and their verdict is final.

"Sometimes, comic boys address their relatives in London in the rudest pictorial form, giving a good deal of trouble to the 'blind men. A picture of a garden and a street, with a fancy portrait of the person for whom this letter is intended, drawn outside the note by a not very artistic youth of seven years of age is not calculated to ease the sorting labor of the central post-office. Letters addressed to 'My Uncle Jon, in London'—'Wilm Stratton, commonly called teapot Weelim'—'Mary Ann Street, Red Rive lane Luke St., next door to the ocean'—'To No. 3 Cros bsbry Row for the Female with the Infant up Bromley Stairs'—'Ann Poror at Mrs. Winhurst's No. 24 Next door to two to one'—'Mikell Goodliff at St. Nouts Printis to a Shoo Maker Mis, his name not known, Mrs. Cooper is grandmother to the Lad'—'elixa clarck saxton hotel, saintluord hon se'—and 'This fanke Taghe Warkitt ill Wise comse Wile of Wythe, with many more like them, are constantly coming under the notice of this branch of the Sorting Department.

"The 'blind men' feel a professional artistic pride in mastering every difficulty, although the difficulty is to be taken to the Land's End for the small charge of a penny. Failing all attempts to make clear that which is never to be read in this world, the interior (after the proper forms have been observed) is at last looked into, only to present a larger, and more enigmatic surface still. The only colorable explanation that can be given of the mystery, based upon the annual average of riddles which come before the 'blind men', is that some Irish hop-picker, passing through London, on his road to Kent, is anxious to communicate with a relative in some part of his native country.

"The sorting office for newspapers and packets is upon an upper floor, and is reached by an endless stair-case, worked by machinery, which revolves and ascends like the spokes of a treading mill. The business in this department is very similar to that below, except that the sorting proceeds more slowly, and the packets, while fewer, are much larger. The 'blind man' here is chiefly engaged with the newspapers whose moist addresses have either come off or been partially torn, and this work, like that of the other department, is the heaviest on Friday night, the great newspaper despatch night of the week.

"He employs himself a good deal in guessing the kind of newspaper which would probably go to certain individuals, when he finds himself with a number of addresses without papers and a number of papers without addresses. No disappointment is so bitter to the country resident as to miss his week's budget of news and reading, when he comes down to breakfast on a Saturday, or to tear open a cover and find a Tory organ which he hates, in place of the Whig organ, which he loves. The newspaper 'blind man' performs his work as carefully as he can; and if he does make an occasional mistake in sending the wrong paper to the wrong man, his countrymen must forgive him, when they know the difficulties with which he has to contend."

## Elevators in English Hotels.

The *Building News* (London) has a long article on "Hydraulic Lifts," from which we extract the following description of the application of the principle to some hotel elevators:—

"Messrs. Easton and Amos are at present employed in constructing, for the Brighton Hotel, a series of hydraulic lifts, which have been lately described by Mr. Whichcord, the architect of that edifice. A square shaft or tower, about eight feet across internally, is built up the entire height of the hotel, with apertures for communicating with each story. Within this shaft the ascending room is suspended by a chain passing over a wheel at the top and loaded to the proper degree with balance weights. The room is fitted up in the manner of a railway carriage, with a central lamp, and, the gearing being carefully made and adjusted, it is expected that the motion will be nearly or entirely imperceptible. The earliest instance of this sort of 'upstairs omnibus' was that used at the Colosseum, where steam power was employed for the operation; but at the Grosvenor, the Westminster, and other large modern hotels, examples will be found of the kind now under consideration. The motion is accomplished by the following means:—The basement floor may be considered as the mid-level of the apparatus, and a well must be sunk as much below the level as the car is to be raised above it. In this well (which may be of small diameter) is sunk the cylinder or barrel pipe, and within this, fitting loosely, is the lifting ram or plunger, consisting of another pipe the whole length of the barrel and working closely through a water-tight stuffing box at the top. It has some resemblance to the pole-plunger of a pump; but, instead of being solid, it is hollow, and instead of drawing water, it is forced by it.

"At the Brighton Hotel, motive power will be derived from a cistern at an elevation of more than a hundred and twenty feet. There are five lifts, viz:—one for passengers from the ground to the fifth, or any intermediate floor, a hight of fifty-six feet. It will be capable of raising half a tun, that is, the weight of eight average persons of ten stone each, the whole distance in one minute; and is estimated to cost, exclusive of cistern, £600 to £650. The second rises from the basement to the fifth floor, a hight of seventy-seven feet, and is constructed on a different principle to the foregoing. A horizontal cylinder and piston give motion to rack and pinion gearing, which, acting on a revolving drum, hoists the load. Its power is equal to a weight of sixteen pounds, and the cost is calculated at £400 to £450. The third lift, for raising wine from the cellar to the bar, or a hight of sixteen feet, and one of the same range for taking dinners from the basement to the large coffee-room, have respectively a power of fifty pounds and a hundred pounds, and cost £75 and £115.

"The remaining lift carries dinners and provisions from the basement to any of the five superior stories. It rises eighty feet, has a power of one hundred pounds, and is estimated to cost $300.

"In the construction of these lifts, safety, smoothness of action, and precision in stopping and starting, are said to have been well attended to, and complete means of communication by bells and speaking tubes are provided at all the stages. The system is presumed to be adequate to the requirements of the large establishment it is intended to serve, as well as to remove the otherwise natural objection to the upper stories.

"It is observed that the application of hydraulic power to buildings may be productive of important changes in their arrangement, and the architect of the Brighton Hotel thinks the tardy employment of this power in London is chiefly due to the low pressure of the water supply. He conceives that a perfect system of water-works should provide in every street, or at least in the principal thoroughfares, 'a main pipe, the pressure in which should always be capable of throwing jets of water in sufficient volume to put out any ordinary fire without the use of engines.' We agree with Mr. Whichcord's opinion concerning the convenience of lifts in all large establishments, such as hospitals, hotels, offices, and domestic buildings; we will even go a step in advance and pronounce that, in this particular department of its application, hydraulic science is as yet but in its infancy, and that, when the intellects of our architects and engineers are fairly directed to the object, it will be found that, by the combination of pneumatic springs, or other auxiliaries, hoists of much greater power than those we have been considering will become common in warehouses, post-offices, and banks. Remove, for instance, from the great postal edifice in St. Martin's-le-Grand, the obstacles presented by its stairs, and the area of the whole building would be as good as doubled; vanquish the exhausting power of hight and we shall see story peep o'er story, as Pope saw 'Alps on Alps arise.'"

## Pisciculture in England.

The London *Times* says the attempt to create an interest in the cultivation of fish in England has completely failed, except in the matter of salmon, which is now furnished in comparative abundance. The *Times* attributes the failure to the popular dislike to fresh-water fish as an article of diet. There is scarcely a fish in the streams which any man would care to eat who had the means of purchasing a bit of meat. Trout are but little eaten; and eels are getting scarce; club, roach, dace, &c., are considered worthless, and the finer varieties, such as pike, tench, and gudgeon, are treated merely as accessories to a dinner and not as a substantial article of food.

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## ACTIVITY OF THE MACHINE-SHOPS.

All the large machine-shops in this city are busily engaged in filling their several contracts, and most of them run day and night.

### THE NOVELTY WORKS.

At the Novelty Iron Works, on the East River, there are now under way no less than 4 beam-engines of the largest class for the Pacific Mail Steamship Company. These engines are 105 inches diameter of cylinder by 12 feet stroke, and are to have surface condensers and expansion gear of the most approved styles. The Company have already in service the *Constitution* and *Golden City*, with similar engines, and they have proved to be most economical and efficient machines. The hulls for the four additional ships are building in this city, two of them by W. H. Webb, Esq.; one by Mr. Eckford Webb; and the fourth by Mr. Henry Steers, of Greenpoint, N. Y. When they are all completed the Company will possess a fleet of vessels which cannot be equaled on the globe for speed, safety, and economy.

There are also building at these Works two single screw engines of 50 inches diameter of cylinder by 42 inches stroke. These are for the Pacific Mail Steamship Company, and are well under way; the vessels are called respectively the *Mariposa* and the *Monterey*. Two revenue cutters, the *Ashuelot* and the ———, have just received their engines, and the former is nearly ready for sea. A full description of the engines of these ships may be found on page 74, of the present volume of the SCIENTIFIC AMERICAN.

In addition to those named above the engines for the *Miantonomoh*, iron-clad, having cylinders 30 inches in diameter by 27 inches stroke, and those for the *Wampanoag*, cylinders 100 inches in diameter by 48 inches stroke, are also in progress. The somewhat celebrated yacht, *Clara Clarita*, is having two engines put in—the dimensions of which are "contraband." W. E. Everett, Esq., is the efficient Secretary of the Novelty Works. Mr. Everett has his eyes everywhere, and under his direction many important reforms have been instituted, and more are in progress. Among them may be noticed a commodious blacksmith-shop, which was greatly needed.

### THE DRY DOCK IRON WORKS.

The Dry Dock Works are immediately below the Novelty Works, and have on hand a large number of heavy contracts which they are advancing as fast as possible. Miers Coryell, Esq., for a long time the chief superintendent of the Morgan Iron Works, has lately purchased the Dry Dock Iron Works from Mr. J. S. Underhill. Mr. Coryell is an energetic business man and thorough engineer; he is in the prime of life, and will, we hope, acquire a handsome fortune in a short time. There are four large boilers building, one for Government; also three other boilers for private parties. Eight oscillating engines of about 20 horse-power each, and two pair of screw engines, 16 inch cylinder and 16 inch stroke, for J. S. Underhill, occupy the machine department. The Dry Dock Iron Works are doing a general overhauling to a number of steamships not necessary to specify.

### THE MORGAN IRON WORKS.

The Morgan Iron Works, at the foot of 19th street, East River, have 4 engines and boilers for the *Idaho*, Government screw frigate, well advanced. These engines are building upon plans by Mr. Edward N. Dickerson, and embrace many novel features in their designs. They are to have four cylinders, 30 inches in diameter and 8 feet stroke, and are to run at very high rates of piston speed. We shall take pleasure in recording the performance of these machines if we are allowed an opportunity to inspect them. M. O. Roberts has an engine of 81-inch cylinder by 12 feet stroke, just finished; and there are further two engines for Mr. H. T. Livingston, of 60-inch cylinder and 11 feet stroke; one 58-inch cylinder and 9 feet stroke for Government; two 100-inch cylinders by 4 feet stroke; and two engines of 84 cylinder by 45-inch stroke, for the Italian Government.

### THE NEPTUNE IRON WORKS.

The Neptune Iron Works, at the foot of 8th street, East River, are also very busy, and have one 85-inch cylinder by 12 feet stroke, beam-engine for Captain Dearborn; one 66-inch cylinder by 12 feet stroke, to be shipped to China and erected there; and one 60-inch by 12 feet stroke, for parties not specified. There is also one beam-engine of 75-inch cylinder and 12 feet stroke, for the *Suwo-Nada*, Chinese trader, and one 65-inch cylinder by 12 feet stroke, for the steamer *Mo-Yune*. All of these engines are intended for the Chinese trade, and, taken in connection with other machines building at other shops, give the reader a most vivid idea of the value and extent of the American commerce carried on in those waters.

Our space does not permit us to give a further account of other shops; we shall resume the subject at an early day.

## Cheap Gas.

Congress is about chartering a new gas company for the city of Washington for the supply of gas having a greater photometric value than that now in use, and at a maximum price of $2.50 per thousand feet. Guaranties of the most stringent character are required from the company of its ample ability to comply with these conditions before the charter will be valid, and the company are anxious to supply gas at that rate under the belief that they can make handsome profits by so doing. The company are to lay down twenty-five miles of six-inch mains before the gas is sold, and for this they are to use the new bitumenized pipes, the patent for which, for this country, is owed by Thurlow Weed and another. This is said to be one of the most valuable patents in this country. The pipes are less than one-fifth the weight, and one-half the price of iron to which they are superior in every particular, being indestructible from oxidizing, and as strong as iron. If it is an object to sell gas in Washington at $2.50, with competition at that, could it not be afforded at less than $3.50 in other cities?

## The Internal Revenue Tax.

—The following manufacturing companies in Massachusetts pay the amounts set against their names per month, for internal revenue tax. It will be seen that none are below $1,000:—

| | |
|---|---|
| Harvey, Arnold & Co., Adams, Print Manufacturers | $1,588 02 |
| S. Blackinton & Son, " Woolen Mfrs. | 1,456 41 |
| Elisha Jenks, Cheshire, Cotton Goods | 3,349 08 |
| L. Pomeroy's Sons, Pittsfield, Woolens | 1,253 07 |
| Taconic Mills, " Cassimere Mfr. | 1,096 41 |
| Plunket Woolen Co., Hinsdale, | 1,289 97 |
| E. Smith Lee, Paper Mfr. | 1,564 62 |
| J. Z. Goodrich & Co., Stockbridge, Cassimeres | 1,058 01 |
| Berkshire Woolen Co., Great Barrington | 1,512 16 |
| Frank Curtis, " " | 1,343 49 |
| Pittsfield Woolen Co., Pittsfield | 1,428 27 |
| Whitney & Lane, Westfield, Cigar Mfrs. | 1,778 65 |
| Ames Manufacturing Co., Chicopee | 1,953 84 |
| Chicopee " " " | 5,278 38 |
| Gaylord " " " | 1,273 92 |
| Indian Orchard Mills, Cotton Goods | 3,336 33 |
| Boston Duck Company, Palmer | 1,575 51 |
| Thorndike Manuf. Company, Palmer | 1,226 03 |
| Hampden Cotton Manuf. Co., Monson | 1,041 78 |
| Hampden Mills, Holyoke | 2,350 29 |
| Kingsbury & Co., " Woolen Mfrs. | 1,026 03 |
| Lyman Mills, " | 1,475 67 |

## Manufacturing Items.

NEW NAIL-MANUFACTURING COMPANY.—The nail-cutting machine of the Wickersham Nail Company, which is really quite an interesting piece of mechanism, can now be seen in operation at the machine works of Moore, Wyman & Co., 76 Sudbury street, Boston; its simplicity and power is quite wonderful, it being capable of cutting from a twenty-inch plate of iron thirty-two two-and-a-half-inch nails per second, or nine pounds of nails per minute. Of one-half-inch nails it will produce one hundred and sixty per second, cutting, heading, and pointing them at the same time, giving a point like a brad-awl, which is a great advantage over the blunt-pointed nail, that so frequently splits or mangles the work upon which it is used. This machine was patented by William Wickersham, Esq., and the principles of the inventor, we understand, can be applied to the manufacture of spikes. The company proposes to purchase the entire patent right of the machine in this and foreign countries, and also for the sale of nails made by it.

THE Cleveland Barrel Manufactory of Scoville & Luce is now turning out flour barrels which are made wholly by machinery, and they are all tested by hot water, and by blowing hot air into them with a bellows. An engine of 25-horse power runs the whole machinery. There are various machines for planing, dressing, trussing, &c., of the staves, which are taken in the rough. The headings are prepared by machinery. A proper saw cuts them in circular form and turns them into proper shape, and the necessary machine is on hand for the purpose of dowelling. Even the hoop, in all its requirements, is looked after. It is cut off, beveled, and punched by a piece of mechanism so simple in its operation that a boy can perform the necessary work.

THE first American organ-builder was Edward Bromfield, Jr., the son of a rich merchant in Boston. He evinced a genius for mechanics, and made for his own amusement musical and optical instruments of great power. He was graduated at Harvard in 1742, and died at the age of twenty-three years. His contemporaries state that his organ had two banks of keys and several hundred pipes, and that its workmanship exceeded anything of the kind which had been imported from Europe.

THE Portland *Advertiser* has a unique clock of English mechanism, called "Preece's one shilling clock." In appearance it resembles an ordinary thermometer, with a small cylinder of mercury, which passes downward through the tube. Its progress is marked by the indicating scale on the side. When it has run down, the whole instrument is reversed, and it is ready for another twelve hours' work. This one appears to work well, and we are told that they have been brought to such a state of perfection as to nearly equal the best time-keeping watches. The clock in question is the property of Mr. Walmsley, British Mail Agent.

J. M. WASSON, President of the Mississippi Manufacturing Company, whose factory is located at Bankston, Miss., has sent out a sample of jeans made at that factory, of equal proportions of cow-hair and wool for the filling. It is a very even and handsome textute, quite strong and serviceable, and would make as comfortable and durable cloth for pantaloons or for negro suits entire, as can be produced. The cow-hair can scarcely be detected without picking the thread to pieces.

WOOD FOR PAPER.—There has been quite an active trade going on in the northern part of Chester county in poplar wood. It is in demand for making paper. The mills at Springville, Chester county, are very extensive, and are worked by New York capitalists. The price of wood delivered on the line of the Chester Valley Railroad is four and five dollars per cord.

THE Merrimac Company have determined to commence printing after a cessation of nearly two years. They propose for the present distributing their goods through the firm of Sprague, Cooper & Colburn. The goods are likely to be on the market within four or six weeks.

## SPECIAL NOTICE.

ZACHARIAH ALLEN, of Providence, R. I., has petitioned for the extension of a patent granted to him on July 16, 1850, for an improved machinery for double-folding wide cloth.

It is ordered that the said petition be heard at the Patent Office, Washington, on Monday, June 27, 1864.

All persons interested are required to appear and show cause why said petition should not be granted. Persons opposing the extension are required to file their testimony in writing, at least twenty days before the final hearing.

WHAT NEW YORK IS WORTH.—The assessed valuation of the real and personal property in the State of New York is officially stated at $1,454,454,817. Of this amount New York city has more than one-third, or $574,416,030. Kings county, in which is included the city of Brooklyn, ranks next in wealth, being valued at $98,147,604. The lowest estimate is for Hamilton county, which stands at $605,000. The assessed value is of course much below the real money value. If the war continues through this year on the same scale of expense as now, the national debt will just about equal the assessed value of the property in New York State.—*American Agriculturist.*

HARD MONEY CURRENCY.—The bill, which has been passed by the Senate, will probably be adopted by the House, substituting a bronze coinage for the present nickel cents, to be composed of 95 per cent. copper, and 5 per cent. tin. There are to be one-cent and two-cent pieces—the one-cent pieces to be a legal tender to the amount of ten cents, and the two-cent pieces to be a legal tender to the amount of twenty cents. Counterfeiting these coins is to be punishable by fine and imprisonment.

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## HOW TO LAY UP AN EIGHT-STRAND GASKET.

Many an engineer who makes his own packing is contented to use a simple three-strand loosely-plaited gasket, for all purposes whatever, from packing a simple governor-valve stem, up to the piston rod, or air-pump bucket. Believing as we do that an eight-strand gasket is much superior to the ordinary kind, that it will wear longer, is a better shape to conform to its situation, and that it requires less compression from the gland to bring it up against the rod, we have

*Fig.* 1.

here illustrated the gasket itself, and also the principle of laying it up. We have endeavored to make both the article and engravings simple and clear, and hope that the practical engineer will derive some benefit from our exposition.

*Fig. 2.*

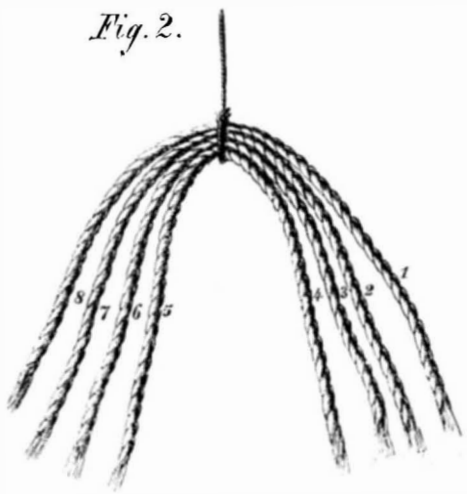
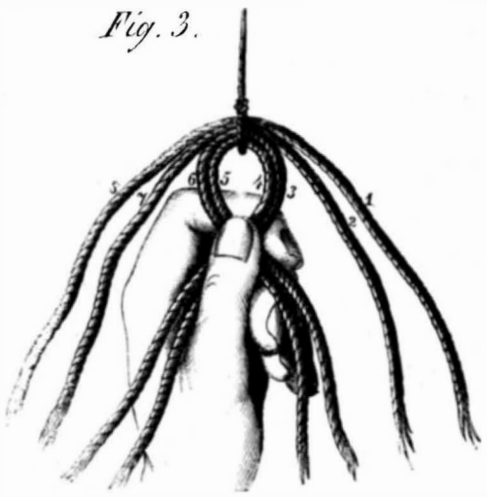


Fig. is the gasket as it appears finished, and immediately below, in Fig. 2, is given the first step towards forming it.

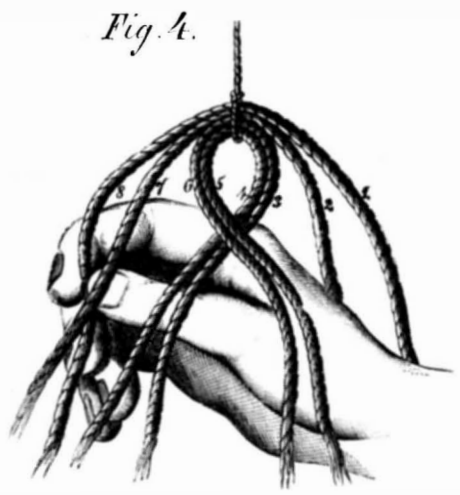
The operator takes eight strands, as shown. These are tied in the center, and numbered, for the convenience of the reader, from 1 to 8.

*Fig. 3.*



In Fig. 3 we have the two strands, 3 and 4, crossed under 5 and 6, and the thumb and forefinger of the left hand represented as closing upon these strands to retain them in place. In Fig. 4 we have the real commencement of plaiting the gasket, and here is the point where the principle is first employed. This principle is that the strand, whatever one it may be the operator has hold of, *must pass under all the strands, and over two strands.* This is the key to the whole matter. It must also be borne in mind that *the top strand* of all on each side, is the one to be taken hold of alternately. In Fig. 4, the finger and thumb of the right hand are shown grasping the strand No. 8; the left hand being supposed to hold the crossed strands. Now look at the hand that grasps strand No. 8, it is inserted between strands 2 and 5 and is *behind* all the strands except 1 and 2, therefore when strand No. 8 is brought under all the strands except 1 and 2, and over strands 5 and 6, it will appear as in Fig. 5, where strand No. 8 is shown drawn around, but not up to its place; the fingers of the right hand grasp it, and the left hand keeps the crossed ones, 3, 4, 5, 6, together.

*Fig. 4.*



In the next figure which is 6, the strand No. 8 is shown loosely drawn up to its place; the operator's hand going under all the strands for No. 1. This strand is to be brought *under* and behind all the other strands, and in between strands 3 and 4 where the hand enters, and thence over 3 and 8 as shown in

*Fig. 5.*

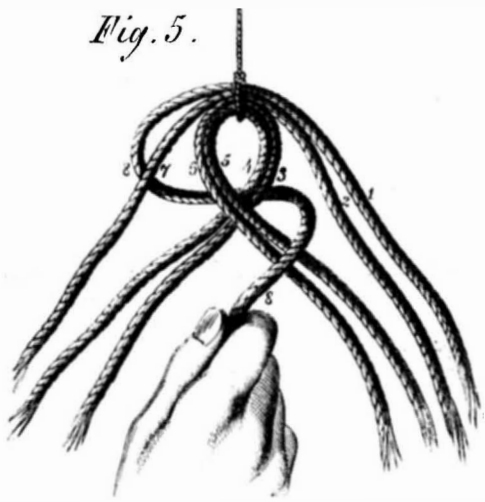
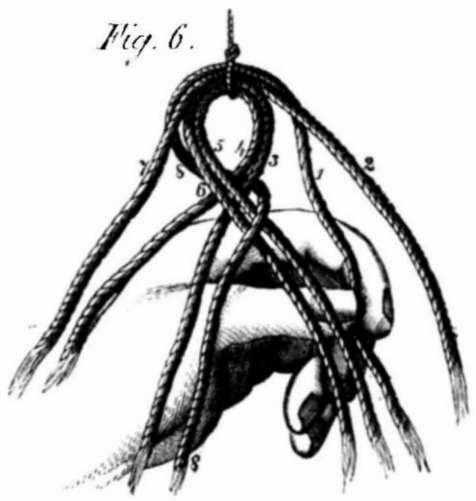


Fig. 7. Thus the principle of this gasket is illustrated, for it is only necessary to go between each alternate set of strands on either side—to take the topmost strand alternately, and to lay it over two strands, to make a hard, firm, and even piece of packing.

Some engineers prefer to use a central core of india-rubber, plaiting the strands over and about it, so that the rubber exerts its elastic force, but is not injured

*Fig. 6.*



by the heat and grease of the machinery. This can be done very easily with the eight-strand gasket by merely allowing the rubber to occupy a central position between the strands, four on one side and four upon the other; the rubber must be cut square and to the proper size, and when it is overlaid with the strands it should be larger than the recess in the stuffing box, so that it will have to be compressed in order to get it in; it will then tend to cling about the rod and wear a long time with good usage.

Let the beginner not be discouraged at the first trial if he does not succeed, for the process is, in reality, a simple one, and inexperienced persons have made

*Fig. 7.*

gaskets from these drawings at the first trial. The gasket should be laid up while reading this description, and we hope all points are made clear and simple, so that a little practice will, as in all other cases, render the braiding of a square gasket as easy as one of three strands.

## POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening, March 31st; the President, S. D. Tillman, Esq., in the chair.

### NEW PROCESS OF MAKING STEEL.

The President, on calling the meeting to order, remarked that the first half-hour was set apart for the examination of new inventions, and invited Prof. Fleury to give an account of Mr. Gerhardt's mode of making steel.

*Prof. Fleury,* of Philadelphia:—"Mr. President and Gentlemen: Before describing the process, I should like to present for the examination of the Association this specimen of steel. I think you will find it of as fine quality as any that you ever saw.

"I will first explain the principle on which the process is founded. It was discovered some time since by Deville that if oxide of iron is mixed with wrought iron, the wrought iron will melt at much lower temperature than it will without the oxide. Mr. Gerhardt applies this principle to making cast-steel by heating scraps of wrought iron in crucibles, to a high degree, and then introducing into the crucibles oxide of iron, or other suitable substance containing oxigen, and immediately after the introduction of the oxide, pouring a quantity of melted pig iron into the crucibles. The oxygen of the oxide combines with a portion of the carbon in the cast iron, and the remainder of the carbon enters into combination with the whole mass to form steel. The degree of carbonizing can be adjusted to a nicety by regulating the proportion of cast iron in the mixture."

After a short discussion on Mr. Fleury's remarks, the President read his usual summary of the scientific and industrial news of the week, from which we select the following items:—

### VALATA.

This tree, growing in Guinea, yields a juice which is used by the natives instead of milk in coffee. M. Serres states that this juice is capable of being worked into a product much more flexible than gutta-percha, and in every way superior to it.

*Dr. Parmelee:*—"Mr. Chairman, I have had 8 samples of valata submitted to me for examination. I have yet investigated its physical properties only. It is not softened by immersion in hot water; it can be vulcanized, and seems to be intermediate between gutta-percha and india-rubber. I understand that it can be procured in large quantities."

### PRESERVATION OF ANIMAL MATTER.

A method was described before the French Academy by M. Pagliari. The substance to be preserved is covered with a mixture of alum and gum bezoine with a

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water, which forms a layer of varnish over the surface of the substance, thus excluding the air, and completely preventing decomposition.

NEW FACTS IN FERMENTATION.

M. A. Béchamp states in the *Comptes Rendus* that if the must of grapes of different kinds is filtered, the ordinary alcoholic ferment (yeast) only appears in it, but if not filtered thread-shaped ferments make their appearance also, and occur largely with the free access of air. The filtered must yields a wine that differs considerably from that of the unfiltered grape juice made in the ordinary way.

SHOOTING STARS.

M. Poey, in a communication to the French Academy, states that from observation made at Havana, the number of shooting stars in the northern hemisphere is double that in the southern. The maximum number of meteors are seen in the northern hemisphere between one and two o'clock; in the southern between two and three.

BLEACHING SPONGES.

The process of M. Artus is to first wash the sponges with a warm and dilute solution of caustic soda; afterwards with warm water. They are then plunged into a bath consisting of a dilute solution of hyposulphite of soda, and some dilute hydrochloric acid. When sufficiently bleached they are taken out, well washed and dried.

ARTIFICIAL RAINBOW.

The *Cosmos* speaks highly of J. Duboscq's contrivance for imitating a rainbow in a French theatre. He employs an electric light made by 100 Bunsen elements. Its rays are transmitted in a parallel direction by means of a lens through a slot in the form of an arc, to a double convex lens of very short focus, from which the rays pass to a prism, and emerge with sufficient divergence to make an effective rainbow, during the ordinary illumination of the stage, on a screen 18 or 20 feet distant.

UNEQUAL POWER OF THE ORGANS OF HEARING.

In making experiments with tuning forks by holding one to each ear at the same time, Herr Fessel, of Cologne, has discovered the ears do not possess an equal power of hearing. It appears that from numerous trials on various individuals the hearing is generally best with the right ear. A similar difference in the power of the right and left eye is also more common than is generally supposed, as the impression made on the weaker eye is absorbed or dissipated by the stronger.

This item and some others gave rise to considerable discussion. The subject of "Conveying Passengers in Cities" was selected for the next meeting, and the Association adjourned.

## Drawing Steel Tubes.

From a long article on this subject in the *Mechanics' Magazine*, we make the following extracts, giving an account of a new manufacture recently established in Paris by a company half French and half English:—

"Messrs. Christoph, Hawksworth & Harding, secured a patent in December, 1862, for 'improvements in drilling, drawing, and rolling metals,' and it is from the success with which the invention thus named, has been carried out that we foresee the application of steel on an extended scale to the manufacture of tubes. Mr. Hawksworth is an eminent steel maker, carrying on business at Linlithgow, North Britain. Years of experience have conferred on him the ability of making steel of almost any quality with absolute certainty. Casting about for new applications of mild steel, the manufacture of tubes suggested itself to this gentleman and his partners in the patent to which we have just referred. The first experiments were conducted at Paris, and so the thing has grown until the commercial as well as the mechanical success of the invention is almost beyond doubt; one of the machines being already at work in Bermondsey.

"The details of the process are extremely simple. Two hydraulic presses, with rams 16¾ inches in diameter, having a stroke of about 12 feet, are erected facing each other, in a horizontal position, on a massive bed-plate of cast-iron; each press has a very heavy flange some 4 feet square at each end. The rams, hollow to save weight, carry similar flanges cast in one piece with them. These last are bolted together so as to form a whole. The recession of one ram from its cylinder is consequent upon the entrance of the other into the opposite cylinder. Stout cast-iron girders brace the presses apart. In the flanges, on the stuffing-box ends of cylinders, are countersunk holes, six or eight in each flange, in which can be placed and secured die plates of different size. In the flanges at the opposite ends are holes disposed in the same axial line, of much smaller diameter. The upper surface of the main bed-plate is fitted with planed tables, on which the central plunger flange traverses, the bed-plate supporting its weight; this central flange is fitted with a peculiar arrangement of screw 'grippers,' to which the tubes to be drawn are affixed. These tubes are made, when the diameter is small, by drilling a hole right down an ingot or bar of cast steel. The cavity is drilled from both ends at once by very ingenious machinery. One end is then tapped to Whitworth's standard, and the outside of the ingot turned down to a rather blunt point, sufficient to permit it to enter the die for an inch or two.

"The method of working the apparatus is extremely simple. The plunger flange is brought into close proximity with one cylinder flange. The ingot to be drawn is threaded, as a lady threads a bead, on to a mandril rod, on one end of which is an egg-shaped enlargement of tempered steel, and on the other a nut and screw. The mandril rod is passed through one of the smaller holes in the back flange of the cylinder, and its length is so adjusted by the nut and screw that the egg-shaped projection is located exactly within the center of the die in the forward flange. The nose, as we may term it, of the ingot is then passed through the die and secured to the plunger flange by screwing the gripper, corresponding to the particular hole in the cylinder flange in which the die is placed, into the end of the internal cavity. Two or more ingots are put in place at the same time to equalize the strain on the flange. The pumps are then put in motion by a steam engine. The plunger flange then proceeds leisurely from one end of its stroke to the other, drawing the ingots literally by the nose through the die, and off the mandril, the egg-shaped head of which maintains the diameter of the bore in its integrity, while it imparts a beautifully burnished surface to its interior superficies; the die doing the same kind office for the exterior. A repetition of the process, changing the dies at each draw for others a little smaller, quickly produces the finished tube, a reduction in external diameter of about 1-16th of an inch being effected by each die.

"After the ingots have been passed three times through the dies they become very hard from compression; they are then removed to a reverberatory furnace and heated to a bright red heat to anneal them. It is a singular fact that their temperature is scarcely sensibly raised by their passage through the dies, provided these last are in good order. A slight abrasion of the wearing surface, however, of either die or mandril, although so slight that the longitudinal furrows produced thereby on the tube are so small as to be scarcely visible, will raise the temperature 80 or 90 degrees at one passage. This is a strange phenomenon, which we have practically verified. The molecular disturbances and the work done cannot be materially affected by such trifling imperfections; indeed, a glance at the pressure gage on the press shows that there is no sensible increase in friction. To what, then, are we to attribute this remarkable effect, produced by so insignificant a cause? Such things apparently introduce a new element into the dynamic theory of heat.

"When two highly polished surfaces are forced in close contact by heavy pressure, they adhere and become one. The old system of plating was based on this fact, thin sheet silver adhering to burnished copper with the utmost tenacity, when passed together through the rolls of a flatting mill. Precisely the same thing takes place with steel, and we have seen an iron tube drawn over a steel one by Messrs. Hawksworth & Harding's apparatus adhere so firmly that they virtually lost identity, and it was impossible to discover where steel left off and iron began, save by the action of an acid. The two metals had been 'cold-welded' to each other. Sir William Armstrong's system of constructing ordnance is rude and clumsy in comparison with that placed at our command by this fact. It is easy to draw tubes 10 inches in diameter, if necessary, or even larger. Such tubes, being made from an ingot cast hollow, are thoroughly homogeneous. By drawing a succession of them one over the other, all the surfaces being bright and burnished, the whole mass becomes cold-welded into one whole, supplying us at once with a gun, stronger possibly than any yet produced. The advantages of this method of constructing ordnance do not cease here, however. If the inner tube is left unannealed, it may be made, by the simple act of drawing, to possess that quality of hardness essential in the chase of any gun intended to stand heavy charges. In addition, by an ingenious arrangement, Messrs. Hawksworth & Harding are enabled to rifle the tube in the act of drawing. Not, be it observed, by cutting away metal to form the grooves, but by pressing them, as a seal does wax. It is a sufficiently suggestive fact that the French Government have ordered, and are now being supplied with 50,000 rifle barrels constructed in this way, furnished by Messrs. Christoph & Harding, of Paris.

"Quitting the subject of ordnance, we find that steel tubes can be produced of almost any length, diameter, and shape. Square with a circular bore, or circular with a square bore, octagonal, square, round, or flat, be the section what it may, it is almost equally easy to manufacture. There are a thousand and one uses to which these tubes can be applied with advantage. Not the least, perhaps, is the Looping of journals. The steel being perfectly homogeneous, and utterly devoid of fiber, such journals, when in use in a good brass bearing, acquire a skin of surpassing smoothness, revolving with so little friction as to be practically indestructible."

## Effect of Alcohol upon the Gastric Secretions.

Dr. Purnell, of Maryland, writes to the *Medical Reporter* as follows:—

"Though claiming nothing new, (it having been long since proven that pepsin in solution, is precipitated by alcohol) I propose to give a brief account of some experiments I have made to show that alcoholic stimulants must often retard digestion by coagulating the the pepsin.

"The mucous membrane of a beef's stomach was macerated in water strongly acidulated with hydrochloric acid. Small pieces of animal and vegetable food, as chicken, beef, bread, potato, &c., were introduced both with and without the addition of alcohol in the form of alcohol, brandy, &c., the experiments being varied. By the addition of the alcohol the pepsin was precipitated from the solution (white precipitate), the chymification was very much retarded, and when a large quantity of alcohol was used, the substances were not after the expiration of two days so much acted upon as within five or six hours in the solution without the spirit. The bottles were occasionally shaken and a gentle heat applied, care being taken to agitate alike, and to apply the same degree of heat to the bottles, all of which were of glass of equal thickness. The alcohol is added after the infusion (by maceration) has been prepared. When the sole object is to notice the precipitate, after introducing the spirit the mixture should be allowed to stand in order that the precipitate may be more distinct. The food may be added with the alcohol or soon afterward.

"In order that a fair experiment might be made, a quantity of water was added to the mixtures in which there was no alcohol, equal to the quantity of alcohol used in the other solutions. Repeated experiments result in varying only according to the strength of the spirit employed."

## The Weight of Iron and Wooden Masts.

In a paper read by Mr. John Vernon, of Liverpool, before the Mechanical Engineers' Society, it is stated that in a 1,200 tun vessel, the three lower masts and the bowsprit, if made of iron, weigh 26 tuns, and if made of steel, 19 tuns, while if made of wood, they weigh 32 tuns. A corresponding advantage, as regards weight, is obtained by the use of iron and steel for the topmasts and yards.

"Boiled Brass."—Some ingenious Englishman at Wolverhampton designed to evade the duties in France and therefore styled certain goods which had been silver-plated as "boiled brass." This was decidedly a new article of manufacture to the Frenchmen, who discovered the fraud on making proper inquiry. The firm were fined for making a false declaration.

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## Correspondence

### The Hen and Chalk Doctrine.

MESSRS. EDITORS:—The article "Peculiarity of Vision," page 215, last issue of your paper, brings up some old, but seldom discussed or thought-of facts and perhaps yet incomprehensible; at least a few years old. I have often tried the "hen and chalk" doctrine, by first placing the former with its bill touching the floor, then beginning at its bill rapidly marking a straight white line directly from it. The hen will seem to be apparently dead, but with its eyes open, neither can it move or will not move right or left, but will remain in any position it is placed. It appears to be in deep thought as a man when his eyes are fixed on vacancy; forgetting even to wink to moisten them.

The above philosophy or doctrine, whatever it be, may also apply to the following:—Take a bird (I took a canary), place it on its back or lay it on its side and begin to wave a feather over its head about an inch above, and it will die, to all appearances, as naturally as if its life-blood were fast dripping away. But there is something else which I have not only heard of, but seen done. It is the power of making a wasp perfectly harmless, so that it can be picked up by the hand and handled with impunity. The secret of this power lies in merely holding the breath. Although I have seen it done and been told by those whose word I cannot doubt, I have hitherto been too timid to experiment to my own satisfaction. Is the philosophy of doctrine of this still a mystery?

G. W. K.

Harrisburg, Pa., March 29, 1864.

[When a boy we have seen this curious experiment with the hen and chalk tried repeatedly. Hold the bill of the fowl just down to the floor, and then with a quick stroke, draw a bright chalk mark from the bill one or two feet along the floor. Let go of the hen gently, and she will stand for a minute gazing at the mark in a strange dazed manner, when she will lift up her head, and, apparently realizing what a fool she has made of herself, will run off cackling.—EDS.

### Impregnable Armor.

MESSRS. EDITORS:—The SCIENTIFIC AMERICAN of March 26th [page 197], contains an extract from a report to the Navy Department, from Mr. John Ericsson, in which he claims the discovery of the expedient of applying a *laminated* protection in order to exhaust the *vis-viva* of the shot in degree before reaching the real armor. Mr. Ericsson is in error if he thinks this new: a large target composed in part of *laminated* one-quarter inch plates, five inches thick, was built by the Messrs. Stevens, at Hoboken, many years ago, the account of which and experiments with it may be found in Mr. Stevens's memorial to the last Congress.

Numerous and varied experiments were made with *laminated* material by Dr. Stuart Gwynn, in 1861, in deciding the value of his "Union Armor" over other methods; one form in which he found the advantageous use of *laminated* plates was to have spaces between the plates, which in a considerable degree exhausted the *vis-viva* of the shot, but this form was not found equal to *laminated iron plates and compressed plank.*

I cannot understand why Mr. Ericsson should suppose his fifteen-inch armor, backed by four feet of timber, is "impregnable," because a Dahlgren XI-inch gun, throwing a *cast-iron* shot, with only thirty pounds of powder, failed to utterly destroy his target; when it is well established that "Stafford's shell" projectile, fired from an VIII-inch Parrott rifled gun, perforated an iron target eight inches thick, backed with fifteen inches of live oak, which was set on fire. The aperture made in the iron was fourteen inches in diameter, and the wood and bolts were terribly broken. This was an experiment with a shell; those with the Whitworth shells in England are well known to you. If these shells can perforate the armor of Mr. Ericsson, what protection would the latter be against the 200 or 300-pound *steel* projectiles, fired with from 60 to 75 pounds of powder? E. H.

Washington, D. C., March 30, 1864.

[In the article alluded to Captain Ericsson does not claim the sole paternity of inventing laminated armor, neither does he in any way attempt to set aside the experiments of others upon this principle of protecting vessels. In quoting the results of Stafford's shell (which we well know is a formidable one), our correspondent propounds the query: "If these shells can perforate the armor of Mr. Ericsson, what protection would the latter be against 200 or 300 pound *steel* projectiles, fired with 60 to 75 pounds of powder?" This what we should like very much to know, as the armor of the monitors has never, in a single instance been pierced; and 300-pounders, firing 75 or even 60 pounds of powder, are such rare weapons that when they are brought into use on ship-board or even safe in an ordinary battery, we may well speculate upon their effects on our iron-clads. The best proof of the utility of the monitors is that, thus far, they have withstood every attempt except carelessness to destroy them. Torpedoes have been fired under them and steel bolts (Whitworth and others) have been hurled at them; yet to-day they are as good, if not better than ever. Viewed as invulnerable armored vessels or rafts, if that term is more acceptable, they are without their equals; when better ships are made we shall hasten to place descriptions of them on record. We call the turrets Ericsson's, because they are designed and constructed by him, whether the principle belongs to another has nothing to do with this question; most of the principal sewing machine makers in this country pay tribute to Howe, but the machines are not all known as Howe's. —EDS.

### "A Fair Wind and Plenty of It."

MESSRS. MUNN & CO.:—I have recently received my Letters Patent for my Folding Saw Horse, and thank you kindly for the very prompt manner in which you have "put my invention through." This is the second like service you have done for me, with very little trouble to myself. The drawings in both cases are accurate, neat, and skillfully done. Of the SCIENTIFIC AMERICAN I need not say anything in commendation, for the paper speaks too plainly for itself. I possess all the volumes from the fourth; and I much regret not having the previous volumes. From them I have derived much valuable information, and know these must have been highly instructive to all careful readers. If you will not accuse me of flattery, I must say it is the last paper in which I should expect to see "light" or "frivolous" matter. Again I return my thanks, not only for your services rendered, but for the valuable paper which imparts, weekly, so much instructive and interesting information. I wish you continued prosperity—"a fair wind and plenty of it." C. J. FAY.

Hammonton, N. J., March 25, 1864.

### Photographing the Eyes of Murdered Persons.

The latest development in this delusion has taken place in San Francisco, Cal., where, a woman having been murdered, a photograph was taken of her eye with the result set forth below. The account is taken from a letter written to the *Bulletin* by an individual who seems to have more fondness for sensation paragraphs and sentences than naked facts; and he "romances" in such a style as to make us rather sceptical whether his account be not wholly imagination, though he avers in his letter that he is not at all given to flights of fancy. Here is his statement:—

"The experiment of photographing the retina of the murdered woman's eye, despite the persiflage and incredulity with which it has been in most quarters received, has either developed a remarkable coincidence or produced a wonderful result. Stamped upon the centre of the retina, and conveyed by the photographic process to the plate upon which the picture was taken there is plainly to be seen the outline of a human figure, so plainly as at once to arrest the attention of the most unimaginative eye. The figure is that of a tall dark man, the lower part of the face muffled in a heavy black moustache and beard, the left arm extended and the whole body thrown into the position of a man doing some violent deed. The face has enough of outline to suggest the possibility of filling it up so as to recognize the man were he met in a crowded street. The bushy hair surmounting a low forehead, heavy eyebrows arching over the cavernous depths where the eyes lie, the shadowy suggestions of the whole face, which cannot be described, but which impress the observer with a strange weird horror, causing one to start back as though with profane hand he had rent the veil and caught a glimpse of that world which lies beyond the confines of the grave. It is idle to laugh at such things. A fool can deny everything, but it is only a wise man who can seriously make up his mind to believe anything.

"The writer is not at all an imaginative man(?) and took no stock in the unauthenticated accounts of marvelous successes, which had attended similar experiments in France. Physiology and philosophy both seemed to laugh at such a theory, and the writer was prepared to treat the thing lightly. But seeing is believing; plainly from the photographic plate the figure of a man looks out, the last object the murdered woman saw on earth, as when she turned her piteous eyes to heaven for help, and saw only the cruel face of the murderer bending over her, while his remorseless hand held the sharp knife quivering to her throat.

"To suppose that the photographic figure to which we refer is the result of an accidental grouping of shadows, is simply to seek a miraculous explanation for a very simple natural fact. For it is much easier to suppose that the outline of the murderer was caught on the sensitive retina than to believe that in the only instance in which the experiment has been attempted in this country, a combination of light and shade should have occurred to produce a shape so exactly like a human figure as to deceive many sensible and unimpressionable men. In any event the experiment is worthy of further trial, and demonstration is easy. Oxen are killed daily. Experiments by photographing their eyes would soon determine whether there is anything in this theory or not.

"Whether or not, granting that the experiment proves successful, it will ever prove of any actual use, is a matter of question. For once establish this fact, and murderers will punch out their victims' eyes before leaving them. And the dead retina might in some instances mislead the living judges. For supposing that a man were talking to and facing you, and that another, suddenly coming up behind, dealt a blow which finished him. Your image would be the one impressed upon his retina, and an innocent man might hang were the eye taken as conclusive evidence. The Coroner in this case mentioned to the jury that he had had a photograph made of the retina of the eyes of the murdered woman. It was imperfect, and showed nothing. He did not have any faith in the thing, but for curiosity's sake, he would have another ambrotype taken immediately."

### Relation of the Force of Heavy Shot to the Resistance of Iron Plates.

The London *Mechanics' Magazine* says of some recent investigations of Mr. Scott Russell upon iron-coated ships:—

"Like Mr. Fairbairn, he has carefully worked out the relative capabilities of our guns and iron plates, extending his calculations, however, to embrace the future; and, although in these days of advancement we should hesitate to accept Mr. Russell's deductions regarding the future as being complete, yet, as the results cannot but interest our readers, we put before them the following thickness of iron plates, which we are to consider proof against the several shots of the weights recorded. For the present: The 4½-inch plate against the 68-pounder; 6½ inch shot against the 136-pounder; 7½ inch against the 200-pounder; and 8½ inch against the 270-pounder. For the future: The 10-inch plate against the 400-pounder; 11 inch against the 500-pounder; and 12 inch against the 600-pounder. These results, the author tells us, are entitled to our full confidence, as the experiments at Shoeburyness fully bear them out."

LARGE ENGLISH PLANING MACHINE.—Messrs. Losh, Wilson and Bell, Walker Iron-works, Newcastle-on-Tyne, have lately had delivered at their works an improved planing machine, adapted to plane marine engine cylinders and other work, up to 20 feet long, 9 feet wide, and 8 feet high, and which is fitted with four tool boxes, viz., two in the cross slide and one in the front of each standard, all self-acting; so that, when an article is placed upon the table, they can be planing three sides of it at the same time, if it is required. This machine weighs about thirty-five tuns, and was made by Messrs. Francis Berry and Sons, Calderdale Iron-works, Sowerby Bridge, Yorkshire.

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### The New Atlantic Telegraph Cable.

The following description of the telegraph cable, which is proposed to be laid across the bed of the Atlantic ocean in 1865, is from the London *Observer*:—

"In the construction of the telegraph cable, the great and difficult problem to solve was how to arrange the various parts as to prevent any strain upon the 'core.' There are some portions of the Atlantic where the depth is more than two and a half miles, and the mere weight of such a length of cable as would extend from the bottom of the ocean to the ship would be sufficient, unless proper precautions were taken, to stretch and probably to break the communication. The line which was first constructed failed in consequence of this point not having been kept sufficiently in view—its specific gravity was much too great for its strength, and it was the strain upon the inner core which was, no doubt, the cause of the failure. The new cable, like the first one, has a centre or core formed of 7 copper wires—6 laid round 1. The weight of copper in these wires is, however, 300 lbs. for each nautical mile, as against 106 lbs. in the first cable. This is in itself an important point of difference, the weight of copper for the conducting wires in the whole length being more than 200 tuns greater than in the first cable. The gauge of the wire to be used is that known as No. 18. These conducting wires are to be insulated by four layers of gutta percha, laid on alternatily with four thin layers of the material know as Chatterton's compound, the diameter of the core thus covered being rather less than half an inch, the exact figures being ·464 of an inch, and the circumference 1.392 inch. In the first cable the core was protected by three coverings of gutta-percha, weighing 261 lbs. per nautical mile—the difference between the nautical and geographical mile is in the proportion of 2,126 to 1,760 yards—the weight of the insulator in the first cable was 261 lbs.; in the one now about to be constructed it will be 400 lbs. per mile.

The next important point to be considered is the protection to be afforded to the core, and the insulating portions. In the first place there will be a "padding" or coating of soft jute yarn, saturated with a preservative mixture, which will be wound round and next to the insulating outer surface of gutta-percha. This will help to resist the strain which will be brought to bear upon the cable when a great length is paid out in deep water. Outside of this padding is the coating, employed only for protective purposes, and forming, of course, no part of the telegraph proper. This consists of 10 solid wires, of the gauge ·095, drawn from homogeneous iron. Each of these wires is surrounded separately with five-strand tarred hemp, the whole of these 10 strands are to be laid spirally round the padded core, and they are formed in such a manner that when a heavy strain comes upon it the wires will lend their strength to the cable. The improvement which the present cable offers over the first one in this respect is very great. In the first cable the protection of the core was sought to be effected by 18 strands of charcoal-iron wires. These were laid spirally round and upon the core. In paying out the cable the whole strain came upon the core or inner portion, and not upon this outer coating of wire, which really served only to increase the specific gravity of the cable, without giving to it any additional strength. The cable about to be manufactured has a vast superiority over the former one in regard to its specific gravity. The first one weighed, in air, 20 cwt.; the present one will weigh 34 cwt. to the nautical mile. In water, however the weight of the first cable was 13·4 cwt. per mile; the specific gravity of the present one, notwithstanding its greater strength and increased diameter, weighs but 14 cwt. When it is considered that probably some six or eight miles of the cable will be suspended in water between the points on which the cable rests at the bottom of the ocean, and the ship from which it is being paid out, it will be seen at once how important is this great increase of strength, obtained as it is with so small an addition to its specific gravity. The weight of the respective cables in air is as 20 to 34 cwt., while the specific gravity, or weight in water, is only a few pounds greater. Buoyancy combined with strength appears, the efore, to have been obtained in a very satisfactory manaer. The hemp which surrounds the protecting covering of the iron wires is much lighter than water, hence the comparatively low specific gravity.

Another important point is the strength or breaking strain of the cable. The breaking strain of the first telegraphic cable was 65 cwt., that of the present one is 155 cwt., or considerably more than twice that of the former. The new cable is equal to eleven times its weight per nautical mile in water. In other words, if the cable were suspended in water it would bear its own weight for a depth of eleven miles. Now, as the deepest part of the Atlantic, between Ireland and Newfoundland, is 2,400 fathoms, or about two miles and a half, its follows that the cable will bear a strain equal to 4.64, or nearly five times its own vertical weight, in the deepest water in which it will be submerged.

The distance to be traversed between Ireland and Newfoundland is 1,640 miles. The first cable was laid with 15 per cent. of "slack" over and above the actual mileage. If the whole of the line be taken on the *Great Eastern*, as is intended, it is probable that this amount of "slack" may be considerably reduced. It is intended, however, with a view of providing against all contingencies, to manufacture 2,300 miles. The total weight of the cable to be laid will be 4,122 tuns, a burden which to the *Great Eastern* will be a very trifling affair. The actual cost of the telegraph and the expense of laying it are to be derayed out of the new capital of £600,000, upon which there is a joint guarantee of the British and American Governments of 8 per cent.

### Manufacture of Maple Sugar.

An intelligent correspondent of the *Rural New-Yorker* furnishes the following information to that paper :—

"I recently saw in your paper an article headed 'Will as much sap run from one spout in a tree as from two?" I don't know, but think from two, in the same length of time, if both tapped at once; but to get the most, one should not be put in till the second or later run, as a wound will dry up some in the time intervening between the runs of sap during the season. "Will a gimlet bit, used in tapping, answer as good a purpose as an auger?" It depends whether you want a bush to last some time or use it up as soon as possible. In a bush of my father's, where sugar has been made over 34 years, some trees were hacked with an axe, and a "spill" put in with a gouge; some with a 1¼-inch auger. Most of these trees are dead, have fallen down, or are dying fast. Since I have helped to manage the bush, some 20 years, we have used a ¾-inch auger, and inserted a round pine "spill" in the hole, the "spill not to be driven deeper than the bark. The trees will not dry up so soon by this manner of tapping; the holes will grow over in the course of five or six years. Some trees that have been cut have covered the holes with wood two or more inches deep. For two years we have used a half-inch bit; the holes will grow up in two years in a thrifty bush, and two "spills" will not injure a tree any more than a ¾-inch hole, and I think hardly as much. We began last year some experiments, on small trees, which have grown from trees an inch in diameter since I can remember, by tapping with a ½ inch bit; some with a ¾-inch chisel, hacking through rhe bark, and some with a ¼-inch bit. The ¼-inch hole runs about as much sap as the ½-inch, and will grow over in a year. Tapped two or more holes in some trees with a ¼-inch bit. I think, and know, that a bush will last longer with small bits; and that a ¼ inch hole will run all that a reasonable man will require.

"What boilers are best, &c., ?" A cast-iron pan is best. I made a great many inquiries, when I got one, fearing a cast one would break, being a large flat surface, and afraid the expansion of the bottom would break the sides, but I resolved to try it. I had one made three feet wide, six feet long, and six inches deep at the edges; and with a sag in the middle an inch or more deeper, so that the fluids would all run to the center. This pan serves us for 197 trees this year, and has for 180 or more for ten years. Week before last I tapped the bush. Tuesday, sap run some, next day more; and the next Sunday night had boiled enough for 200 lbs. of sugar, from 196 trees tapped with a ½-inch bit; so you can judge what tapping with a ½-inch bit will do. A pan, of the size above described, will accommodate a larger bush, with a smaller pan of any kind to heat the sap while running into the boiler. With five cords of wood, and not sound or best wood at that, I have boiled from 500 to 600 lbs. with one pan.

The sugaring-off is done in the house, over a fireplace. After it is settled, it is put in a kettle, and brought to near milk-warm; then put in white of three eggs well beaten to three pails of sirup, and about a pint of milk, and gradually bring to a boil; when the scum has got stiff, take it (the scum) off; keep boiling moderately till the scum has risen; then keep boiling steadily until done to make good sugar; do not allow it to keep rising and going down in kettle.

"Or one can sugar off in a common milk pan, set on top of a stove, to a very good advantage, by putting a little in a pan to keep it from running over when boiling.

"The scum can be made into vinegar by pouring water on it, diluting it, settling it, then scalding and straining it, being sure to have it sweet enough ; for according to the saccharine matter in it will be the strength of your vinegar. Do not put anything in it to turn it sour. Sirup and vinegar should all be strained through a flannel strainer. For dipping sirup out of a pan have a dish something like a dust-pan made deeper, and not so wide, and the top partly covered by a piece of tin soldered on, with the handle put on one side, so as to stand beside the pan, and dip it out. With it you can dip so that there will not be a gill left in the pan.

"This pan has never been off the arch since it was first put on, except to repair the arch. It cost, when new, $20, with four iron handles, like basket handles, riveted on near the four corners, to handle with when necessary. It will hold a barrel of forty gallons and boil.

"Buckets are hung on the side of the tree, on a nail; tenpenny is large enough. Buckets should be cleaned out at the end of the season, so that no sour or slimy sap shall be on to taint them through the year. We usually wash and scald them well each year. The natural tendency of sheet iron is to color anything that comes in contact with it, and it will scorch sugar easier or sooner than cast iron, and requires a blaze under it, when cast iron will boil with coals.

"W. W. Horton.

"Alleghany, Pa., March 20, 1864."

### A Titled Machinist.

Lord Oxmanton was at some manufactory, the name I have heard, but have forgotten. In walking through the works he met with the principal, who, finding him well versed in the subject, and taking him for a practical man, explained some improvements he was about to make. His lordship discovered a fallacy in the plan and predicted that it would fail, but the other was confident in his calculation, and so they parted. Some time afterwards, when his lordship was walking to the House of Commons, he was accosted in the street by one who turned out to be his too confident acquaintance, and who said: "I have been often, since we last met, wishing to see you. You was right and I was wrong, and I am going to make you an offer. My engineering foreman is going to leave me, and if you will come down, and construct the work your own way, I will give you a post." "I am much obliged," replied his lordship, "but I could not accept your offer without consulting my father." "One would think you were old enough," said the other, with some scorn, "to be out of leading strings. And when can you hear from your daddy?" "I can give you an answer at once," said Lord Oxmanton, who saw his father, then Earl of Rosse, approaching. When the latter came up, he was informed of the offer, and entering into the joke, said he was quite willing his son should accept the post if it did not interfere with his parliamentary duties. "And who is he?—and who are you, old gentleman?" roughly demanded the Brummagem. "I am Lord Rosse," was the reply, and this is Lord Oxmanton." Eventually, the latter consented to look down for a few days in Warwickshire, and give his friend the benefit of his best advice, which ended, this time, in the thoroughly successful completion of the improvement in hand.—*Bristol (England) Times.*

Induration of Stone.—Mr. F. S. Barff, of Dublin, for preserving and hardening brick, stone, and other surfaces, and timber, proposes to use soluble silicate of soda, or of potash, by preference the silicate of potash with a mixture of sulphate of barytes and carbonate of lime. The mixture is laid on with a brush.

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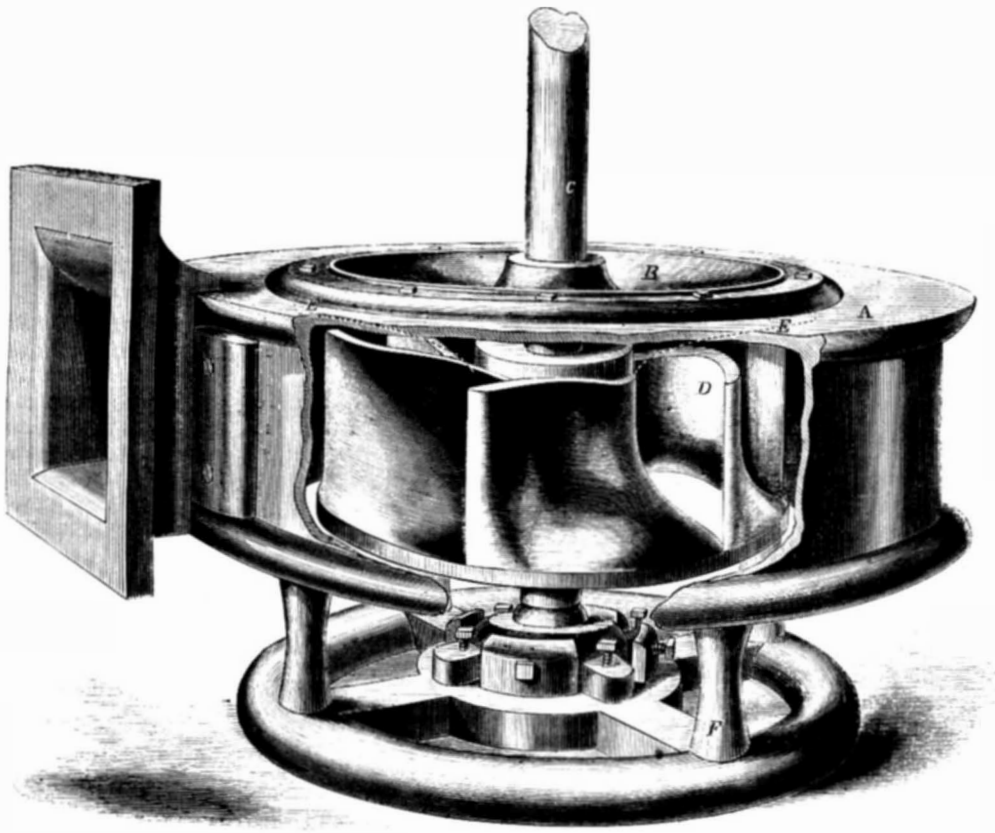
### Improved Center-vent Water Wheel.

This invention relates to that class of water wheels known as the "central discharge," and the object of the inventor has been to render them more efficient by preventing the escape of water which generally takes place between the top and bottom of the wheel. To this end the bottom of the wheel is connected at the buckets by a circular rim extending entirely around them, said rim fitting snugly in an opening at the bottom in the case or scroll, A, through which the water enters to perform its work. At the top the cover, B, is curved as shown by the dotted lines, so as to deflect the water against the buckets in the most favorable manner to impart power. The shaft, C, runs in a step at the bottom, as usual and carries the wheel, D, which may be all cast solid upon it. These buckets are peculiar in form, and the curve of them is tangential to the circumference; they are also curved in a vertical direction, as shown in the broken-out portion of the scroll; by this formation it is claimed that a more efficient action and a greater percentage of the force of the water is obtained than is usual. The wheel is supported on the circular frame, F, at the bottom, which permits the water to have free exit and renders examination of the several parts a simple matter. The upper part of the hub of the wheel fits in a recess in the bonnet or cover to the water case, so that the shaft is not strained in carrying the wheel when at work.

This wheel is a convenient and simple machine for utilizing the force of water, and would be valuable to mechanics, millers, and others in the country, where steam is not available or desirable. It was patented Jan. 14, 1862, by W. W. Flenniken, of Colony, Iowa. For further information address the inventor as above.

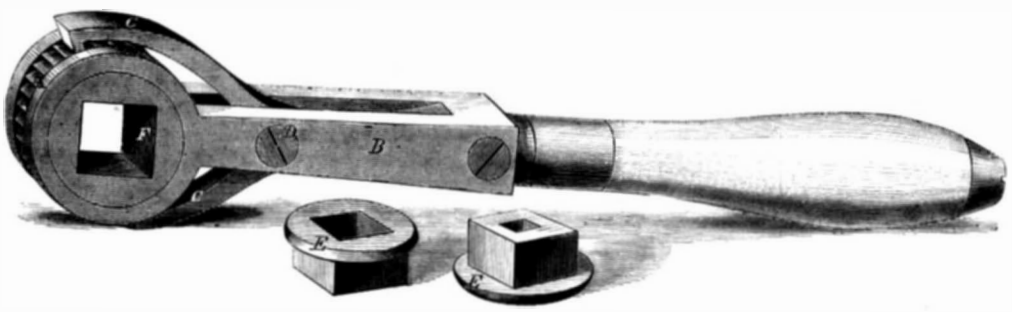



FLENNIKEN'S CENTRAL-VENT WATER WHEEL.

### Improved Wrench.

Machinists and others very frequently experience difficulties in turning nuts or holding bolt-heads so that the nuts can be screwed on them when the same are situated in places where they cannot be reached by an ordinary wrench.

We have illustrated a useful tool herewith by the aid of which nuts, taps, rimmers or any other cutting instruments can be turned without removing the wrench at each stroke. It will be seen that the ratchet wheel, A, is confined between two side pieces, B, between which it works easily, and that there are two pawls, C, which work on the center, D. These have springs inside by which they are kept up to their work on the teeth. By the side of the wrench we have shown two sockets, E. These sockets are made to fit the square hole, F, in the wrench and their inner apertures are cut to various standard sizes, of any shape, either triangular, six or eight-sided, as may best suit the nature of the work to be done. The shoulder on these sockets prevents them from falling through, and when they are to be used they are inserted in the aperture of the wrench. It is obvious to the mechanical reader that when the handle of this wrench is moved back and forth, the pawls engage with the ratchet teeth in one direction and slip over it in another, thus imparting an intermittent revolution to the bolt or nut acted on. When the nut is to be unscrewed the wrench should be reversed or turned upside down. This is a useful tool and can be made available in many cases where a common wrench could not be, and it is in other respects quite as efficient for drilling holes as the wrenches ordinarily used.




RICHARDSON'S PATENT WRENCH.

This tool was patented through the Scientific American Patent Agency on the 18th of June, 1863, by J. J. Richardson, of Woodstock, Vt. For further information address the inventor at that place. Rights for sale.

### ORNAMENTAL STEAM ENGINES.

A notable feature in the construction of steam engines at the present time is the absence of senseless and misplaced "ornaments." Where at one time "scrolls," "beads," "acorns," "mouldings," "panels," &c., were clapped on to every unoccupied square inch of a bed-plate, steam chest, or engine frame in the country, we have now plain, simple, and handsome castings, without elaborate finish or meretricious decoration. It is almost superfluous to say that this is a positive addition to the appearance of the engine, and an advantage in other respects, which at first thought does not appear. It is not an unwarrantable assumption to say that the designer instead of racking his brains for some uncouth combination of every known order of architecture for an engine frame, will turn his attention to more important subjects, and seek to reduce the size of the coal bunkers rather than add to the expense of running the ship by carrying around tuns of iron in some senseless abortion of an "ornament." We hail this return to the suggestions of good taste with unfeigned delight, and hope that the banishment of "Gothic frames," heavily beaded bed-plates, connecting rods with elaborate mouldings turned in the center, and innumerable other "contraptions," is but the beginning of an important reform in this particular. Severe taste is better than lavish display, and if there is any place where heavily recessed cornices and similar abominations are out of place, it is about an engine, where grease drips down and dust adds its mite to the accumulation until in a short time such a mess accumulates that the tables Hercules cleaned are toilet tables in comparison. Let us have more economy in the use of steam, let us have fewer pounds of coal to produce a horse-power, or turn our attention to the boiler and its construction, for if any appendage of the steam engine requires thorough and radical reform it is this. All the ornaments that a steamship could carry about its engine would not move the machine one inch, and they are nuisances in every respect, they are an offense to the sight of cultivated persons, they are an annoyance to the molder, they are a positive detriment to the endurance of the metal, for flaws and sand holes lurk under arabesques where they are unsuspected until they reveal themselves by some disaster. Away with such sources of expense! Let us have good, sound, plain, flat surfaces of iron, that we can rely upon for the purpose it is intended for.

### WELDING STEEL COLD.

We gave an account, some time since, of the welding of steel plates, which occasionally occurs at Hecker's flouring mills in this city. The engine crank shaft is a heavy cylinder of iron standing vertically, and to prevent the end upon which it rests from heating, a number of smooth steel plates were placed in the step to revolve upon each other, and thus distribute the friction between their several surfaces. The rubbing of these plates together of course ground their surfaces perfectly true, so that they fitted exactly to each other, and at the same time made these surfaces bright. Under these circumstances it was found that whenever the lubricating material was pressed from between the plates, they would be welded together so that they could not be separated with a cold chisel and sledge. In considering this circumstance, it had occurred to us that perhaps a thin film of the surface might be heated by the friction to the ordinary welding temperature, and that, therefore it was not a case of the cold welding of steel. In an account, however, on another page, of the drawing of steel tubes, it will be seen that when one tube is drawn over another under great pressure, the surfaces in contact being perfectly bright and clean, the tubes are welded together in the most thorough manner, and that careful observation shows that there is no elevation of temperature during the operation.

It is now understood that we have in our Navy Department, ordnance unsurpassed by that of any other navy in the world

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THE

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(Illustrations are indicated by an Asterisk.)


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## ARE IRON-CLADS INDISPENSABLE?

To every shield there are two sides, and upon every subject of importance diverse opinions. Iron-clad ships of war in one form or another have occupied much attention of late in the mechanical world, and the ingenuity and science of the most learned and gifted men have been lavished upon them. The results, both upon this continent and abroad, are patent to all those who are well informed. England is satisfied with her latest achievements in this line, France has but one idea of an iron-clad vessel, and the expression of it is much the same as the English models, and our own Government, if not far ahead of both of these other nations, has at least had the test of practice applied and successfully borne. The Italian Government is building four iron-clad ships, two in England and two in this country (one of the latter—the *Re de Italia*—is now at sea and her passage will be looked to with extraordinary interest), but these, although splendid ships of their class, are in no wise different from ordinary wooden ships, with the exception of their armor-plating of 4½ inches thickness. Hitherto the difficulty with iron-plated vessels of all classes has been their unseaworthiness, for the models and weight of armor disposed in the best manner to render the hull and battery invulnerable, have not as a fixed principle, been found safe for sea service. Not even the *Normandie*, the "crack" ship of the French navy, fulfilled the expectations of her constructors, for although she made a voyage to the Gulf of Mexico and back, it was, if we may believe the reports published after her return, anything but successful, and this is also a noticeable feature in the experimental trips of the British ships. It is a dirty bird that fouls its own nest, and it is a silly nation that tells stories of its own stupidity or short-comings. We cannot look for anything like a true report of the behavior of iron-clad frigates of the broadside class until we receive advices of the *Re de Italia's* safety, for though we impute nothing dishonorable to British officers, naval or engineering, their interests are so identified with their feelings that an impartial report is impossible. Revulsions of opinion follow swiftly upon the immoderate expression of it, and there are not wanting certain slow, calculating persons capable of judging, and tenacious of their opinions, who assert, as they have from the first, that when the *furore* is dispelled which now invests this subject, the maritime nations of the world will discard their armored ships as they have, for centuries almost, rejected knights in armor or iron-clad men as useless. The two are hardly to be compared, for before the days of artillery a helmet was a good protection against a sabre cut, and a cuirass proof against a lance thrust, but with the introduction of cannon iron-clad men became useless and were dispensed with because they were unavailable. There are also other reasons which we cannot enumerate at this time. One of our most prominent and successful naval commanders, whose name we cannot give, for the assertion was made privately, declared it to be his conviction that the day was not far distant when there would be no more iron-clads, and the nation who possessed the fewest would have the most money in its treasury. To show that he is not alone in this view of the matter, we quote from an English paper the opinion of some French officers of standing to an "own" correspondent of the journal aforesaid. This writer who was allowed access to the principal armored vessels of the French navy says:—

"The French officers are of opinion that, however unpalatable it may be to both the French and British Governments, the time must come when they will have to give to engines and coal the weight now appropriated to armor-plates, and in the interests of policy and humanity allow the shot and shell that may strike a ship's side to pass through and through with no difficulty and few splinters. Indeed, they jeer at all our ships, and express the hope that, as we have been so mad as to build useless ships, we will now be wise enough to lead the way in the abandonment of iron-clads altogether.

"Notwithstanding the alleged superiority of the *Solferino* and *Magenta* to all other iron-clads at the present time afloat or building, the French officers conceive that ships without armor that would steam two knots or so more an hour, and carry a week's more coal, would be still more effective and better worth having.

"In matter of guns the French officers believe us to be perfectly insane. The 600-pounder fired with half a charge of powder—viz: with 70 pounds instead of 140 pounds, the service equivalent, only three times an hour—is a standing joke among them. For their part they desire nothing heavier than the old British 32-pounder, as when they exceed that weight the ships suffer in a seaway, and in such a case would be less efficient against an enemy. The favorite French gun, therefore, is a gun throwing a 32-pound shot or a 64-pound bolt, the guns possessing three plain grooves for the bolts."

It would be interesting to know what kind of a joke a 15-inch shot fired six times an hour would be to these jovial Frenchmen, and it would doubtless chagrin them not a little to hear and see one come crashing through the sides as in the case of the *Atlanta*, the rebel iron-clad so summarily captured by the *Weehawken*. At the present time our own Government is constructing three ships, frigates we should call them, which are to have immense engine power, and we may presume, armaments to correspond. If hulls full of engines and boilers, fine models and high steam pressure are capable of producing fast ships, then Chief Engineer Isherwood and the designers of the hulls of these ships will have done what, thus far, all their detractors and calumniators have failed to accomplish. These frigates are not iron-clads, but wooden ships of great strength; and their success will mark another change in that most fickle of all things—public opinion.

## THE METROPOLITAN SANITARY FAIR.

The all-absorbing topic at present is the great Fair and its prospects. War for a time is placed in the back ground; and, as if it never existed in the land, the merry-makers and staid busy people of the metropolis strive, each in their own way, to make this Fair the crowning triumph of the others which have preceded it in different parts of the country. It is well known to most of our readers that an immense building has been erected in this city, upon 14th street and Sixth avenue, to accommodate the contributions which have been so lavishly handed in for the benefit of the Sanitary Commission; and also another one, subordinate but nearly as large, upon Union Square and 17th street. In these two buildings are stored vast quantities of the most costly goods, all of which were literally given freely to be sold for the benefit of our sick and wounded soldiers. New York is not alone in this lavish generosity, for the States, and cities of States, around about her borders, have responded nobly to the call made upon them, with the result set forth.

The attractions provided for the entertainment of visitors are so varied that we cannot in our limited space make other than the briefest mention of them. The dry goods, furs, and haberdashery in general, will have charms for numbers; while more will seek the machinery and fancy goods departments. Curiosities of all kinds abound, among which are some which may be truly termed both national and natural. These last are a band of Indians from the Far West, who will live in the most primitive style; in every respect following their usual habits. The "Knickerbocker" kitchen will represent most faithfully the manners, customs and diet of our Dutch progenitors in years long since forgotten; and the guest of to-day may take a seat in a wide-bottomed Dutch chair before the yawning chimney or fire-place, and partake of food similar to that on which his ancestors lived in days gone by. Arms and trophies of three wars are also to be exhibited; the results of the skill and cunning of our handicraftsmen of all callings can be bought cheaply; and it is hoped that, not only our citizens will avail themselves of the two weeks during which the Fair will remain open, but that others from all parts of the country will find an opportunity to spend at least one day at the Fair.

The enterprise was formally opened on Monday the 4th instant; all New York enjoyed a holiday, and in the evening the special ceremonies took place. The prices of admittance to the Fair are as follows:—Season tickets, $5; on Thursday, Friday and Saturday, of the first week, 50 cents. The Committee reserve the right to change the prices daily.

## ANOTHER STEP IN EDUCATIONAL REFORM.

By a circular from Columbia College we learn that that great institution is about to follow the example of Brown University and Harvard College in establishing a separate course of scientific instruction.

It is a curious fact that our old institutions of learning are the most conservative element in our social life. A hundred years ago, when the great pages which modern science has opened to the human intellect were a sealed book, the languages and the literature of ancient Greece and Rome were almost the only fields of learning; and it was reasonable and proper that a mastery of these in their minutest details should be the end of the student's labors. But since Geology, and Chemistry, and Natural History have made known their great and wonderful truths, the importance of classical learning has dwindled into comparative insignificance.

The Athenians were an intellectual people, but they lived in an age of ignorance. Their religion was a mass of childish superstitions, their history was in the main a collection of absurd fables, and neither their science nor their philosophy was based upon the truths of nature. A study of their language and literature was simply learning the way in which an ancient intellectual people gave utterance to their ignorance and their delusions. This study was all very well when there was nothing better to learn. But to us has been opened the great book of nature, teeming with its marvelous revelations, so vast in extent that the most indefatigable study of a life-time is insufficient to master its varied contents. The microscope has made known a creation of invisible beings millions of times more numerous than the visible inhabitants of our globe. Chemistry, in the study of the elements and their compounds which make up the universe of matter, has accumulated a mass of learning too vast for any single intellect to retain. Geology has unraveled the records of the rocks, and traced back the history of the earth through times so remote that the intellect is appalled in the vain effort to conceive of their duration. It has studied the slow coming forth of the strange life upon our planet, in successive generations of species, and in the regular gradations ordained by the Great Intelligencer whose design is manifest in all of their wonderful organizations. Finally, Astronomy has discovered, in the immeasurable depths of space, systems of worlds so numerous and so far removed, that, in the mere effort to imagine the distances or the numbers, the mind of the modern student is led to conceptions of the universe, broader and more comprehensive than ever entered

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the dreams of the ancient poet or the thought of the ancient philosopher.

With a passing glance only at all of this varied knowledge, our seminaries of learning go on in the old dog-trot way, devoting the most valuable years of the student's life to the minute details of Grecian and Roman literature and language. We are glad to see the conservative persistence in this course giving way. Among all the signs of the times, there is none more full of glorious promise than the steady progress of that reform in education which is substituting, for the puerilities of ancient fable, the useful and the sublime truths of modern science.

## FACTS CONCERNING THE GOODYEAR PATENTS.

We have examined some of the testimony which has been taken in the Goodyear patent extension case, and, apart from our general opposition to the principle of extending patents by Congress, we are thoroughly convinced that it would be a gross outrage upon the rights of the public to sanction another extension. The appeal to Congress is ostensibly made on account of the poverty of the family; but how they will be able to support it on such ground, and in face of facts, is one of the mysteries that we must leave to the ingenuity of the lawyers, who are usually most admirable scene-shifters. The testimony reveals the fact that the Goodyear heirs have nine patents in the United States, forty-seven in Great Britain, sixteen in France, four in Belgium, three in Austria, and two in Holland, making a total of seventy-one patents. The cost of procuring these patents must have amounted to a very large sum, and, without doubt, the expenses thus incurred are all charged to the two American patents, which are now before Congress for extension. The estate of Charles Goodyear claims to own the patent of Nelson Goodyear, granted in 1851, the tariffs from which amount to nearly if not quite $30,000 per annum. We wonder if these receipts on the part of the estate are as carefully accounted for, as are the expenses, which appear in the testimony? We notice in the schedule of debts owed by the estate one then of over $9,000, which Goodyear paid for a "flock" patent in England. We wonder what this item has to do with the two patents now before Congress? If it is legitimate to lug into the account "hotel" and other bills, we submit that it is equally important to show the full measure of receipts which accrue to the estate from all other sources besides the two patents in question. To support a claim of poverty and suffering, which can justify Congress in acting favorably upon the cases, it cannot be regarded as honorable on the part of the petitioners to charge all the items on one side, and withhold those upon which the heirs are depending for their support.

It also appears that during the year 1863 only five of the licensees paid tariffs to the estate of Goodyear, amounting to over $22,000, and the receipts—from Jan. 1, 1864, to Feb. 10—have amounted to nearly $20,000, to which add receipts from the Nelson Goodyear patent—some $30,000—and we submit in all candor that the heirs will find in their poverty much that will afford them solid comfort. There are thousands of meritorious inventors, tradesmen, and farmers, who would wax joyful in such a state of indigence.

It is estimated that the nett sales of the various manufacturing companies now engaged in producing india-rubber goods will amount annually to not less than eight millions of dollars. Now if the patents are extended for another term of seven years, at this rate of sales, from which the heirs are to receive five per cent., the amount coming to them would be nearly, if not quite, four hundred thousand dollars per annum—or two million eight hundred thousand dollars. Think of that, ye hard-working farmers and mechanics! Will you consent that your industry shall be thus taxed for the benefit of a few heirs and some eight or ten rubber manufacturing firms?

We are fully aware of the immense financial ability and "wire-working" capacity which the "combination" possesses—it is already apparent in the well-arranged details that are now in operation to secure the extension; but we do not—we cannot—believe that our legislators can sanction this stupendous encroachment upon the rights of the people. There is not, in our judgment, one particle of moral or legal merit in the claim; and unless we are much nearer to the degenerate age than we suppose, we feel warranted in assuring the public that Congress will not allow the extension; and even if it should, we think the President, upon a proper representation of the opposing facts, would never sanction it by his signature; the opposition, however, must be earnest and energetic. Every man in the country, who has its welfare in view, should remonstrate against the scheme. Write letters to your members of Congress, and stir up your State Legislatures to act against it. One hundred and seventeen members of the New York Legislature have signed a memorial to Congress against it; but the opposition is not yet what it should be.

## THE COST OF COAL.

We have before us a report of the Ashburton Coal Co., whose mines are located in Schuylkill and Luzerne Counties, Pa. The report says that each colliery when worked to the best advantage will produce 75,000 tuns of marketable coal annually, making the aggregate yield of the mines 450,000 tuns. *The cost of mining will be about* $1,30 *per tun, and the transportation to the New York market about* $2.90, *making its cost per tun in New York about* $4.20. The selling price of coal in New York to-day is $9.50 per tun, showing, if this report can be relied upon, a clear profit of $5.30 per tun. We have never believed that the coal companies were warranted in charging such extravagant prices for coal, and here we have the published proof of the correctness of our views. To maintain the present exorbitant price of coal in face of these facts is an imposition, and we trust that some measures can be adopted to put a stop to the continuance of this extortion upon the necessities of the people.

## SWINDLING MINING COMPANIES.—LOOK OUT FOR THEM!

One of the most alarming signs of the times in which we live is the extraordinary and villainous speculations now rife in Wall street, in the shape of gold and other mining operations. Bogus companies are forming every day, whose foundations are as the "baseless fabric of a vision," and soon they will "leave not a wreck behind." A prominent gentleman in this city informed us, a few days ago, that he had been offered $20,000 for the use of his name as trustee of one of these "shyster" mines; and being an honest man he declined to have his name used for the base swindle. We warn the people to beware of these swindlers—they should shun them as they would the gambling-hells of the city. These vile schemes are incubated and hatched in the region of the Stock Exchange, and are designed to entrap the innocent and unwary. Every one of them ought to be indicted by the Grand Jury, and the guilty swindlers sent to Sing Sing. The famous forger, Huntington—now serving his time in prison—was not one whit more guilty than are the rascals who engineer these bogus mining operations.

## THE NEW STEAM REVENUE CUTTERS.

On page 74, present volume of the Scientific American, we gave a detailed account of the engines of these vessels, and on the 1st instant, we saw one pair of them under steam. These engines are geared, it will be recollected; and nothing can exceed the regularity and and smoothness with which they worked. Holmes' balanced slide valve is attached to the engines, and on this occasion worked admirably. The main valves have large areas, and removing the pressure from the faces is attended with advantage well-known to engineers. The contrast between geared screw engines and direct-acting ones was, in this instance, very marked, as these machines were running at a very low rate of piston speed while the screw was revolving rapidly and noiselessly; the vessel was, however, alongside the dock. We hope to be present on the trial trip when we shall no doubt present facts of interest to the engineering profession. Mr. George Simmons is the chief engineer of the vessel which is called the *Ashuelot*. Mr. Simmons has been for many years upon first-class sea-going steamers, and is a skillful and careful engineer.

Good manners are a part of good morals; and it is as much your duty as your interest to practice in both.

## RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

*Head-rest.*—This invention consists in a self-fastening spring clamp capable of being attached instantaneously to the back of a chair or car seat or any other similar article, and provided with a stationary and with an adjustable socket, in combination with a vertically adjustable pad, in such a manner that by fastening the clamp to the back of a chair or seat of any other description, and inserting the pad in either one of the sockets the pad or head-rest can be readily accommodated to the desired position and to the stature or size of the occupant of said seat, and a convenient and comfortable rest for the head is obtained. Ephraim Hambujer, of Detroit, Mich., is the inventor of this improvement.

*Copying Press.*—In copying presses the platen is attached to the pressure screw by means of a socket termed a foot-piece in which the screw is obliged to turn freely. The foot-piece is commonly made of a separate piece of brass and secured rigidly by screws to the platen and attached to the screw by turning a groove in the lower part of the screw and casting a groove in the interior of the foot-piece, and pouring zinc or other easily-fusible metal or alloy into the said grooves through a hole provided in the bottom of the foot-piece, before the latter is attached to the platen. The object of this invention is to make a cheaper connection between the screw and the platen, and to this end it consists in casting the foot-piece in the same piece with the platen. Francis Hovey, of New York city, is the inventor of this improvement, and further information may be had of the assignee, E. W. Frost, of 24 Beekman street, New York.

*Gas-cooking Apparatus.*—The object of this invention is to produce the largest possible heat by the consumption of the least possible quantity of gas, and this object is obtained by the combination of a mixing chamber with a central air passage, in such a manner that the gas is first mixed with atmospheric air in said chamber, and furthermore, a supply of fresh air is thrown into the center of the flame, and by these means sufficient oxygen is supplied to completely consume the component parts of the gas and to produce the most intense heat. The mixture of air and gas is burned between two edges, and by this arrangement, together with the central air passage, the flame assumes the shape of an annular cone, whereby the gases rising through the burner are compelled to come in contact with each other and not a particle of gas is allowed to escape unconsumed. E. W. Bullinger, of Brooklyn, N. Y., is the inventor of this improvement, and he may be addressed at Box 1,775, Post-office, New York.

*Apparatus for separating Gas.*—Petroleum on being taken from the wells contains a large quantity of gas, which, when separated from the oil, can be used for fuel, and also for the purpose of illumination, and furthermore by expelling the gas the inflammability of the oil and the danger of explosions consequent upon this inflammability is considerably reduced. By the apparatus which forms the subject of this invention the gas is expelled from the oil by the action of a current of air forced in by a fan-blower, or any other convenient means, and by the action of an air-pump it is stored up in a suitable receiver from which it may be conducted through suitable pipes to the place or places of consumption. Jas. Smith and Allan Greig, of Tarrville, Pa., are the inventors of this improvement.

In the south of Russia, grapes are preserved by the following process:—They are gathered before they are quite ripe, put into large air-tight jars, so filled with millet that the grapes are kept separate. They are sent in this way to the markets of St. Petersburg. After remaining thus for a whole year they are still very sweet, all their sugar being developed by the ripening process in the pots.

Sunflower Seed.—Chickens are very fond of sunflower seeds, which not only fatten them very quickly but make their flesh very tender, juicy and fine-flavored. Therefore it will be well for you to plant sunflowers in some corner of your grounds for this purpose.—*Cor. of Dollar Newspaper*

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ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING MARCH 29, 1864.

*Reported Officially for the Scientific American.*

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

42,060.—Pulverizing Machine.—William Adamson, Philadelphia, Pa.:

I claim, first, The two rollers, F, and F′, and the two feeders, n, n, in combination with a hopper, X, situated above the rollers, and as wide, or nearly as wide, as the same.

Second, The lever, H, and rod, R, or its equivalent, the rod I, and gum elastic cylinder or block J, or other equivalent spring, and the regulating nut, m, in combination with the movable boxes, E.

42,061.—Cuvette and Tray for Photographic Purposes.—Henry T. Anthony, New York City:

I claim constructing cuvettes and other vessels for holding the solutions for photographic uses in the manner substantially as described.

42,062.—Nut for Wrenches and other Tools.—James S. Arthur, Cordaville, Mass.:

I claim, first, The nut, C, and the toothed block, b′, operating in combination with the shank, A, to adapt the jaw, B′, to be either freely slidden on the said shank or adjusted by the screw.

Second, I claim the sliding toothed block, b′, constructed and operating substantially as and for the purposes explained.

42,063.—Animal Trap.—Henry Bagley, Mechanicsville, Iowa:

I claim, first, The connecting rod, n, constructed and operated as herein set forth.

Second, The trap doors, c, the rods, d and g, and the connecting rod, h, the whole arranged and constructed substantially as and for the purposes herein set forth.

42,064.—Spring Punch.—Peter Bauer, Newark, N. J.:

I claim, first, The socket, b, in the jaw, B, in combination with the hollow thumbscrew, d, and tubes, c, constructed and operating substantially as and for the purpose specified.

Second, The adjustable screw anvil, g, in combination with the jaws, B, C, of a punch, A, as and for the purpose set forth.

Third, The receptacle D, arranged in combination with one of the handles of a punch, A, substantially as and for the purpose described.

[This invention consists in the arrangement of a conical socket in the outer end of the cutter jaw fitted to receive tubes or cutters of different sizes and provided with a hollow thumb-screw in such a manner that by removing said thumb-screw the tube or cutter can be readily removed and replaced by another of different or of the same size. The invention consists also in the application to the supporting jaw of a screw-plug of brass, copper, or other soft metal which will not injure the cutting edge of the cutter in such a manner that the face of said screw-plug can always be adjusted according to the length of tube in the cutter jaw, and when said face is worn out, it can easily be filed off and re-adjusted; the invention consists, finally, in the arrangement of a tube or receptacle in or under one of the handles closed by a screw-plug or other suitable device, in such a manner that the different tubes can be readily introduced or taken out, and that said tubes are always on hand when they are required.]

42,065.—Apparatus for concentrating Auriferous Ores.—Joseph A. Bertola, New York City. Ante-dated March 21, 1864:

I claim the movable grating or gratings, d, applied to the inclined plane or trough of ore-concentrating apparatus for the purposes and substantially as specified.

I also claim the bars or slats, 1, 1, formed deeper at the lower end of the grating than at the upper end, for the purposes and as specified.

42,066.—Ball Carriage.—Albert D. Bishop, New York City. Ante-dated February 17, 1864.

I claim a carriage in which the balls or rollers for sustaining a traversing weight may be shifted in the manner and for the purpose described.

42,067.—Suspender Buckle.—Philos Blake, New Haven, Conn.:

I claim, first, Forming a suspender buckle of two parts, that is to say of a loop piece and a shield, when the former is bent at right angles or thereabouts and hinged to the latter under the arrangement hereinbefore described, so as to operate in the manner and for the purposes set forth.

Second, In combination with a loop piece bent at right angles, or thereabouts, and hinged as described to a shield, I claim corrugating or recessing the face of the shield corresponding with the bent part of the loop piece substantially in the manner and for the purposes as set forth.

Third, Hinging the loop piece in line with or above the folding edge thereof, for the better impinging of the strap and for its ready adjustment substantially as set forth.

42,068.—Portable Blacksmiths' Forge.—John Francis Bridge, Deadwood, Cal.:

I claim a box-shaped portable forge of the form herein described, containing within itself this combination of the flange-headed tuyere as g, a fire box with a depression formed in its bottom, to be filled with brick or clay as at o, and a light sheet iron slack trough as at p, when the box with all these parts combined, is mounted on legs that can be operated and folded to the sides substantially as specified.

42,069.—Grain Drill.—Alexander Brooks, Factoryville, N. Y.:

I claim in combination with the seed rollers D, D, arranged as described, and with ungrooved portions, or cylinders, occupying the intermediate concentric spaces, the sliding register plate, E, either with or without an index to indicate its movements, arranged and operating substantially as herein set forth.

I also claim the combination of the flat-sided roller, N, and hinged angle levers, n, n, with the ratchet-wheel, O, and pawl o, substantially as and for the purpose herein specified.

I also claim the combination of the crank, m, on the roller, N, the connecting rod, M, and crank lever L, substantially as herein specified, for automatically operating the clutch by which the shaft of the seed rollers is coupled to the driving cog wheel, H, or uncoupled therefrom when the drill teeth are raised and lowered.

42,070.—Cooking Stove.—Nicholas S. Brown, Litchfield, N. Y.:

I claim the arrangement of the hollow partition check-plates, e1, e2, e3, e4, e5, perforated holes h, h, h. h, h, h, hollow plates, C, with opening, d, in combination with the partitions, E, and G, and movable furnace, B, when constructed substantially in the manner as herein described and set forth.

42,071.—Gas Stove.—E. W. Bullinger, New York City:

I claim the combination of the edges, b, c, with an annular gas-mixing chamber, C, and its disk, F, substantially as herein shown and described.

42,072.—"Lazy Jack" for Sails.—Samuel B. Butler, Middletown, Conn.:

I claim, first, The endless ropes, K, K′, and pulleys, d, d, and g, g′, in combination with the single ropes, e, e′, arranged and operating substantially as and for the purposes set forth.

Second, Adapting endless ropes for use as "lazy jacks," substantially as described.

42,073.—Mode of collecting Oil on Surfaces of Rivers.—John Cannon, New Richmond, Pa.

I claim a boom stretching across a river or a portion thereof, consisting of a trough A, or equivalent, for the purpose of collecting in a body the oil that floats on the surface, so constructed that the oil is allowed to flow in, on the upper side, while it is prevented from flowing over on the lower side, substantially as herein set forth. In combination with the trough, A, I also claim the float board, f, arranged and operating substantially as and for the purpose herein specified. In combination with the trough, A, I also claim the strainer, g, substantially as herein described

42,074.—Fire-place Stove.—Alfred Carson, New York City:

I claim, first, The pendent plate C, in the fire-chamber arranged rotatively with draught passages substantially as shown and for the purpose specified.

Second, In combination with the pendent plate, c, the pipes, D, damper, F, box, E, all arranged substantially as and for the purpose herein set forth.

[This invention relates to certain improvements in grates, such as are fitted in a fire-place, and leave only their front exposed. The object of the invention is to obtain a grate of the kind specified, which will radiate the heat into the room or apartment and at the same time serve as an air-heating device for warming apartments above that in which the grate is placed; all being so arranged as to economize in heat by preventing the same from escaping, with the products of combustion, up the chimney or flue.]

42,075.—Machine for boring Wagon Hubs.—Ezra Caswell, Newport, Mich.:

I claim the screw rod C, provided with the adjustable and removable cutters I, J, in connection with the rings, E, G, provided with the set screws, F, F, and connected respectively by means of the arms, c, c, nut, D, and the arms, f, f, and collar, g, with the rod, C, substantially as and for the purpose herein set forth.

[This invention relates to a machine for boring the hubs of wheels for vehicles in order to adjust the metalic boxes within them, and it consists in the use of a screw rod provided with adjustable knives and having rotary concentric clamps placed or fitted upon it, and all arranged in such a manner that a very durable, simple, and economical machine is obtained for the purpose specified.]

42,076.—Mode of operating the Rolls in Drawing Frames.—Joseph Chase, Worcester, Mass., and J. M. Stone, Andover, Mass.:

We claim so arranging and operating the rolls of a drawing or condensing machine that the reciprocating movements of adjacent sets of rolls shall be in alternate directions, substantially as described.

42,077.—Screw-head.—Harvey B. Chess.—Pittsburgh, Pa.:

I claim the head, c, formed by bending the wire in the manner herein described in the form of a ring perpendicular to and concentric or nearly so with the screw shank or stock.

42,078.—Draft Tube for Soda Fountains.—Gustavus D. Dows, Boston, Mass.:

I claim an interceptor arranged within the draft tube of a soda apparatus, and operating for the purpose above set forth.

42,079.—Horse Rake.—Orson D. Dunham, Plainwell, Mich.:

I claim the combination with the handle, F, and rake head, A, of the elastic hook bars I, and catches J, as and for the purpose herein set forth and described.

[This invention relates to an improvement in that class of horse rakes which are provided with rigid straight teeth fitted in a head which is allowed to rotate in order that the rake may discharge its load. The parts being so arranged that the rake may, by a slight manipulation on the part of the attendant, be made to revolve and its load discharged with certainty.

42,080.—Device for operating Windlasses.—Jacob Edson, Boston, Mass.:

I claim the combination and arrangement of the swinging beam, adjustable radial arms and lever-bars, operating together substantially as described, and for the purposes specified.

42,081.—Scythe Fastening.—Pinkney Frost, Springfield, Vt.:

I claim, first, The loop D, constructed with screw tapped ends fitting into recesses formed in the snath in combination with the two screw fastenings, d, d, the whole constituting a clamp for securing the scythe to its snath substantially as described.

Second, The perforated clawplate, E, when constructed substantially as, and for the purposes described.

Third, The construction of the ferrule, C, with flat sides, c, c′, groove, k, and perforations for receiving the ends of a clamping loop, D, substantially as described.

Fourth, The double bevelled wedge, G, in combination with a clamping loop, D, constructed and operating substantially as described.

Fifth, The combination of clamping loop, D, scythe handle, a, claw, a′, and perforated claw plate, E, constructed and operating substantially as described.

Sixth, The tenons or spurs, h, h, formed on the clamp plate, E, substantially as and for the purpose described.

42,082.—Concussion Bulb for Fuses.—Geo. P. Ganster and Isaac S. Schuyler of New York City:

We claim a percussion fuse consisting of a pear-shaped bulb, formed of glass, containing sulphuric acid hermetically sealed, and having on its exterior a paste composed of chloride of potash and sulphur, all as herein described and for the purpose specified.

42,083.—Rotary Pump.—Richard Gilbert, Rochester, N. Y.:

I claim first, The diaphragm, D, wings, B, and B′, and shell or cylinder, A, in combination with the double pistons, P, and P′, and cylinder, C, the parts being constructed and arranged substantially in the manner specified.

Second, Making the cylinder, C, with one or both of its heads, H, and H′, detachable, they being attached with their inner face flush with the outer edge of the pistons P, and P.

42,084.—Head-rest for Railway Carriage-seats.—Ephraim Hambujer, Detroit, Mich.:

I claim the self-fastening spring clamp, A, provided with a stationary socket, b, and adjustable socket, h, in combination with the vertically adjustable head-rest or pad, C, constructed and operating in the manner and for the purpose herein shown, and described.

42,085.—Portable Gasometer.—John H. Hayward, New York City. Ante-dated March 23, 1864:

I claim, first, The application of the movable piston-head or compressor, and its several parts, for the purpose of expelling the gas.

Second, The use of the double cone spring, or springs of other shape, by means of which the gas is compressed and expelled from the cylinder.

Third, The ratchet rod, with its several parts, as a means by which a steady and uniform pressure is maintained upon the gas while being expelled for consumption.

42,086.—Plows.—William Henry, Wyoming, Pa.:

I claim the two plows F, F′, attached to the adjustable bar, C, which is fitted in the beam, A, and has a perforated semi-circular bar, D, attached to it through which a bolt, E, passes: in connection with the wheels, G, and bar I, the latter being connected with the bar, C, by the bars J, J, and all arranged substantially as and for the purpose herein set forth.

42,087.—Deck and Side Light for Ships.—E. S. Hidden, New York City:

I claim a side and deck light composed of an iron frame, fitted for supporting a glass, non-corrosive hinges and fastenings, or either of them, and an iron frame that may be attached to the side of the vessel; the whole being constructed and possessing characteristics substantially as hereinbefore set forth.

[This invention consists in applying non-corrosive hinges and fastenings to a cast-iron dead light. The claim fully explains the character of the invention.]

42,088.—Potato-digger.—R. D. Jones, and Thos. Purcell, Rochester, N. Y. Ante-dated March 21, 1864:

We claim, first, Adjusting the rear end of the revolving belt, B, by means of the standard, J, hanger, h, and stirrup, s, substantially as described, so as to change the inclination of the belt, B, and at the same time secure a uniform depth of mesh between the pinion, P, and the spur wheel, F, at all points of the adjustment.

Second, The tubular or pipe box, n, in combination with the hub h′, hanger, h, and shaft, f, when all are arranged in the manner, and for the purpose set forth.

The employment of the gatherers, R, constructed and arranged in the manner and for the purpose set forth.

42,089.—Washing Machine.—Salem T. Lamb, New Washington, Ind.:

I claim the combination of a tub and rubber constructed, arranged, and operating together, as herein described, and for the purpose set forth. I also claim the suspending of the rubber disk, E, and its frame, D, on the high post, A, by means of a spring catch, g, when used for the purpose herein described. I also claim the treadle, G, in combination with the three-armed lever I, as and for the purpose herein described.

42,090.—Window Sash-weight.—Henry Lanergan, Boston, Mass.:

I claim the improved window sash-weight as made with the knot chamber, B, the rope passage, a, and the opening, b, arranged together and within such weight, substantially in manner as described.

42,091.—Adjustable Front Sight for Ordnance.—John B. Learock, Boston, Mass.:

I claim the improved ordnance fore-sight as made with the shade annuls, F, the sight standard, D, and cylinder, E, and in other respects so as to be adjustable, substantially as specified.

42,092.—Brush for cleaning Boiler Flues.—Geo. P. Leonard and William Lauster, Fall River, Mass.:

We claim a brush for cleaning boiler flues, made as herein shown and described as a new article of manufacture.

[This invention consists in a brush made of flat pieces of wire or narrow strips of thin metal which are passed through a stem formed by doubling up a piece of wire or strip of sheet-metal and fastened by a thin round wire wound round the same in such a manner that by said binding wire a hollow stem is formed, and after the whole has been secured together and twisted, a handle can be introduced into one end of said tubular stem, and the brush is ready for use.]

42,093.—Beehive.—Rodman Lovett, Canton, Ohio:

I claim attaching the comb-frames, D, to the removable or detachable side, a, of the body, A, of the hive in such a manner that the comb-frames will be allowed to swing laterally, when said comb-frames, thus attached, are used in connection with the body, A, constructed with the side, d, divided into the vertical parts connected by joints, e, so as to admit of the body being opened or distended to expose the comb-frames substantially as set forth.

42,094.—Stone and Root Grubber.—James B. Lyons, Milton, Conn.:

I claim two strong iron hooks or prongs, E E, when secured to a beam, A, sufficiently long to reach the ring of the yoke when oxen are used, or the ring of the neck-yoke when horses are employed, for the purpose of steadying the implement and preventing it bouncing about, in the manner as and for the purpose set forth.

42,095.—Stump-puller.—James B. Lyons, Milton, Conn.:

I claim the application and use of the ox-cart, neap, wheels, and axle, in combination with a double windlass, pulley, blocks, and derrick-frame, mounted on wheels for the purposes herein specified.

42,096.—Scupper for Vessels.—Robert Lang Paige Manning, Cleveland, Ohio:

I claim forming a series of scuppers along the bulwarks, and closing and opening the same by means of hinged scupper-boards, arranged in a single row along the deck or in a series one above another, the same being constructed, arranged, and operating as and for the purpose herein set forth.

42,097.—Corn Harvester.—Wm. M. Mason, Polo, Ill.:

I claim, first, The combination of the retracting fingers with the spring-platform, as and for the purposes set forth.

Second, The combination of the diagonally-arranged finger-beam, the adjustable rotating reel, the spring platform, and the vibrating fingers, substantially in the manner and for the purposes set forth.

42,098.—Railroad Chair.—Green B. McDonald, Louisville, Ky.:

I claim the base plate, A, provided with the pendant flange, B, and the lip, D, in combination with two or more hooks, C C, all arranged substantially as and for the purpose set forth.

[This invention consists in constructing the chair with a base plate, a bottom flange and a lip, and using in connection therewith two or more hooks; whereby the chair may be adapted to suit rails of any size or pattern, or to connect two rails of different sizes.]

42,099.—Grate Bar.—James McDonald, Cincinnati, Ohio:

I claim, first, Connecting the bars of a furnace grate to the rear bearing by universal joints, E F, which enable the bars to be agitated in three several modes or directions, as set forth.

Second, The provision on a universal-jointed grate-bar of shoulders, K K′, and fillet, G, in the described combination with the jog, H, in the bearing bar, for retaining such grate bars firmly in position when at rest, as herein described.

42,100.—Reducing Ores of Copper and Silver.—James T. McDougall, San Francisco, Cal.:

I claim the art of reducing the ores of copper and silver to the metallic state, by smelting them in combination or contact with fusible hydrous silicate of alumina.

42,101.—Portable Apparatus for distilling Wood, &c.—George E. Mills, New York City:

I claim, first, A portable apparatus, mounted on wheels, constructed and arranged in the manner herein described, for the purpose of distilling woody-fibrous and vegetable substances.

Second, I claim the corrugated cylinder surrounded by an iron casing, to which the fire-boxes are attached with the surrounding space between and under, for distributing the heat uniformly throughout the mass, the center pipe or flue connecting with the smoke stack and the movable grate, all in combination in the manner here described.

Third, I claim a condenser in combination with a portable apparatus for distilling vegetable matter, the same being divided into two compartments, for the purpose of condensing and clarifying the essential oils produced therefrom.

42,102.—Apparatus for cleaning Fire-chambers.—George R. Moore, Lyons, Iowa:

I claim the clamp, e, operating in combination with the fire chamber of a stove or heater, substantially as above set forth.

I also claim the shovel, s, connected and operating together with the clamp, e, in combination with the fire chamber of a stove, substantially as above set forth.

42,103.—Vapor Stove.—Oscar F. Morrill, Chelsea, Mass.:

I claim the arrangement of the valve stem, reservoir conduit and hand wheel when the conduit is extended into and through the reservoir.

Also the extension of the said stem and conduit through and beyond the reservoir, and providing the conduit with the extra hole, s, the whole being substantially as specified.

Also the combination of the auxiliary valve, g, and its actuating mechanism (screw, h, and wheel, i), or other equivalents, with the aero-vapor burner, as described, its conduit, D, reservoir, C, its main valve, l, and an actuating mechanism so made and applied to the valve as to be separate and distinct from the actuating mechanism of the auxiliary valve, g, as to enable either of such actuating me-

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chanism, with its valve to be operated or put in operation, without at the same time effecting any movements of the other of the said actuating mechanisms and its valve, the whole being arranged substantially as described.

Also the combination of the hand wheel, o, of the valve stem, n, with the conduit, D, substantially in manner and so as to serve the purposes as specified, the hand wheel under such circumstances being recessed and screwed on the conduit, instead of the valve rod being screwed into the reservoir.

I claim in combination an arrangement with an aero vapor burner, substantially as described and its fluid vaporizer or means of converting the hydro-carbon fluid into a vapor, the adjustable valve, g, and its seat, the same being for the purpose of enabling the vapor to be ejected out of the vaporizer to a hight sufficient to enable it to pass up through the wire gauze diaphragm of the air and vapor mixer of the burner.

I also claim the combination of an aero-vapor burner, substantially as described, a reservoir, a conduit or vaporizer and two valves, so arranged that one of such valves may be used to control the ingress of fluid into the vaporizer, and the other to control the egress of combustible vapor therefrom.

I also claim the combination of a fluid reservoir and aero-vapor burner, with a valve to regulate the escape of vapor under an arrangement to operate in the manner and for the purposes set forth.

I also claim the combination of a fluid reservoir and vaporizer, the aero-vapor burner and the requisite valves to regulate the supply of fluid and the escape of vapor, together with a stove or support for vessels or articles to be heated.

### 42,104.—Clock Pillar.—Wilford H. Nettleton, Bristol, Conn.:

I claim the clock pillar formed with collars swaged or swelled out by endwise compression, substantially as specified.

### 42,105.—Railroad Car Axle.—John C. Nye, Cincinnati, Ohio:

I claim the combination and arrangement of the outer hollow axle, B, minor axle, H, collar, L, and screw, C, screwed in place by a set screw, F, or its equivalent, said axles overlapping as far as practicable the whole distance between the wheels, substantially as and for the purpose herein specified.

### 42,106.—Brick Kiln.—C. D. Page, Grand Rapids, Mich.:

I claim, first, The charger, F', with one or more compartments, provided with slides, f, and rods, n, in combination with the cupolas, in the manner and for the purpose set forth.

Second, I claim one or more vertical cupolas, C D, and metallic chutes, C' D', in combination with the furnaces arranged in the manner and for the purpose set forth.

Third, I claim the spring breaks, I J, in combination with the chutes, in the manner and for the purpose described.

Fourth, I claim the endless apron, G, in combination with the chutes and dampers, M, in the manner and for the purposes set forth.

Fifth, I claim the air-chamber, L', in ombination with the chute and damper, M, and apron, G, as and for the purpose specified.

### 42,107.—Call Bell.—Emery Parker, West Meriden, Conn.:

As a new article of manufacture I claim a call bell, C, angular step, F, pressure-rod, D, working within the aperture, d, substantially as and for the purpose described.

### 42,108.—Folding Bed-bottom.—F. C. Payne, New York City:

I claim a folding bed-bottom provided with a joint composed of the plates, d d, connected with the adjoining ends of the frames, A A, as shown, and having the clocks, D, attached centrally to them, substantially as and for the purpose herein set forth.

[This invention relates to an improvement in the construction or arrangement of the joint of the bed-bottom, whereby the same, with mattress attached, may be compactly folded without injuring the mattress, as is the case where an ordinary joint is employed, in consequence of the mattress being bent with a quick curve which creases the latter and soon causes it to become chafed and worn.]

### 42,109.—Manufacture of Sugar.—Thomas J. Price, South Union, Ky.:

I claim the construction and arrangement of apparatus for crushing and squeezing the cane, sorghum and other similar saccharine plants and for boiling and defecating the juice thus obtained, substantially in the manner herein before described.

### 42,110.—Sewing Machine.—Owen Redmond, Rochester, N. Y.:

I claim governing the motion of the looper, n, by means of the set of pinions, k l m, situated in the head, 5, in such a manner that the said looper shall come in proper position to catch the needle thread and carry it around the shuttle, and then discharge it, substantially as herein set forth.

In combination with the set of pinions, k l m, situated in the head, 5, I also claim the rock-shaft, h, crank, i, and connecting rod, E, jointed to the lower end of the needle bar, C, substantially as described.

I also claim gaging the length of the stitch and indicating the gage by means of the eccentric, w, provided with the pointer, x, and the cork, v, for deadening the sound, when the same are used in combination with the feed bar, I, as herein set forth.

I also claim operating the yielding cloth-plate, L, by means of the bar, M, adjusted to raise the cloth plate more or less to adapt the action to either thick or thin fabric, by means of the screw, b', or equivalent, said cloth-plate being used in combination with the feed-bar, I, substantially as described.

I also claim the brake, T, pivoted to the band pulley in combination with the pin or stop, 1', or equivalent, arranged in such a manner as to be thrown outward clear from the stop when turning forward, but to fall and strike the stop and arrest the motion when turned backward, substantially as specified.

### 41,111.—Dying Kid Gloves.—J. T. Reed, Charlestown, Mass.:

I claim the finger-board, A, and the detached thumb-piece, G H, held together and making one mold or form when the glove is placed upon it, substantially as herein described and for the purpose specified.

### 42,112.—Grain Drill.—Walter Ross, Oshkosh, Wis.:

I claim in combination with the hoppers, a'' a'' and b, the cog-wheels, m o and n p, and levers, k l, all arranged and operating in the manner herein shown and described for the purpose of adapting the machine to be readily converted from a grain drill to a corn-planter, as explained.

### 42,113.—Opening Envelopes.—Alfred L. Seabury, Norfolk, Va.:

I claim the stitching of a thread through and through the envelope in such a manner that any one may be enabled to cut or tear it open with expedition, in the manner set forth.

### 42,114.—Corn-sheller.—Asa F. Severance, Concord, N. H.:

I claim the combination of the cylinder, C, shaft, D, plate, B, and hoppers, H and E, the whole constructed and arranged to operate substantially as and for the purpose set forth.

### 42,115.—Liniment for Rheumatism.—George Shepherd, Philadelphia, Pa.:

I claim the composition or liniment made in the manner and of the materials substantially as herein set forth.

### 42,116.—Grain Drill.—U. H. Shockley, Litchfield, Ill. Ante-dated March 23, 1864:

I claim the arrangement of the rotary front wheel, E, and pole, G, with the frame, A, clearer, K, and seat, D, in the manner herein shown and described.

[This invention relates, first, to an improved cleaning or clearing device constructed and arranged in such a manner as to keep the drill teeth perfectly clean or free from dirt, weeds and trash, as the machine is drawn along. The invention relates, second, to an improved means for guiding, turning, or steering the device, whereby the driver in that respect has full control over the device. The invention relates, third, to an improvement in the seed-distributing device, whereby the quantity of seed to be sown on a given area may be varied as desired.]

### 42,117.—Sewing Machine.—John J. Sibley, New York City:

I claim, first, The combination of the under thread-carrier with the needle and rotating hook and operative parts of a Wheeler & Wilson sewing machine (except the bobbin and ring slide), substantially as and for the purposes described.

Second, I claim the separate organization of the under [thread-carrier with its lever, in an independent frame, in such manner that it may be at once attached to the Wheeler & Wilson sewing machine, in the place of the ring slide, so as to bring the thread-carrier and its actuating lever in co-operative relation with the hook and needle and the cam that advances the cloth, substantially as described.

### 42,118.—Grate.—George L. Smith, Brooklyn, N. Y.:

I claim, first, Forming the air passages or openings in sections of grates diagonal or angular to the length or width of the grate, in combination with a grate constructed of a series of sections, substantially as shown and for the purpose described.

Second, I claim forming the air passages or openings in sections of grates diagonal or angular to the length or width of the grate, as shown and described and for the purpose set forth.

### 42,119.—Washing Machine.—Hamilton E. Smith, Pittsburgh, Pa.:

I claim arming the wooden ribs of the revolving perforated vessel of a washing machine with metal wires, plates or bars, substantially as and for the purpose herein set forth.

### 42,120.—Bedstead Fastening.—Jacob J. Smith, Philadelphia, Pa.:

I claim the fastening described, the same consisting of the plates, C C', constructed and applied to the post and rails of a bedstead, so as to operate together in the manner described for the purposes specified.

### 42,121.—Apparatus for separating Gas from Petroleum. James Smith & Allen Greig, Tarrville, Pa.:

We claim an apparatus consisting of a tank, A, blower, C, air-pump, F, receivers, G, pipes, D B H, and spreader, a, arranged and operating substantially as described to separate gas from oil.

### 42,122.—Lamp Burner.—Willard H. Smith, New York City:

I claim, first, The cap, e f g, constructed and applied as and for the purpose herein set forth.

Second, The insulator, a b c, constructed and applied as and for the purpose herein set forth.

Third, The combination of the insulators, e f g and a b c, in the same burner constructed, combined, and applied as and for the purpose herein set forth.

### 42,123.—Wick Tube.—Willard H. Smith, New York City:

I claim the construction of flat wick tubes with a semi-circular orifice at the bottom, whether the base of the tube be circular or semi-circular.

I claim the wick tubes represented by figures 1 and 2, constructed as represented and for the purpose specified.

### 42,124.—Jointing and Burring Saws.—L. B. Southworth, Deep River, Conn.:

I claim, first, The rotating cutter-wheel, E, arranged in the swing frame, F, in combination with the adjustable slide, G, and carriage, H, and with the saw, D, and self-feeding pawl, f, all constructed and operating in the manner and for the purpose substantially as herein shown and described.

Second, The employment or use for the purpose of burring saw-teeth, of the tool, J, in combination with the reciprocating carriage, L, constructed and operating substantially as herein specified.

Third, The tool-holder, r, dog, u, and spring, t, in combination with the tool, J, and carriage, L, constructed and operating substantially as and for the purpose set forth.

[This invention consists in a vertically adjustable head with a transverse slide which forms the bearings for the pivot of a swinging frame carrying the jointing wheel or cutter in combination with two pawls, one to feed the saw by its action on the teeth and the other to arrest it in the desired position in such a manner that the cutter or jointing wheel can be readily adjusted to saws of different diameters, and the operation of jointing can be performed perfectly uniform with little effort and with the greatest accuracy; it consists also in the employment, for the purpose of burring saws, of a triangular tool or blank file, which is secured to a reciprocating carriage and combined with a self-acting dog in such a manner that in moving the carriage towards the saw the tool is pressed down into the teeth and in moving the carriage back, the tool is raised by the action of the dog and the saw allowed to turn and to bring the next succeeding tooth in the proper position to be acted upon by the tool.]

### 41,125.—Lithographic Printing Press.—J. W. H. Stübbe, Boston, Mass.:

I claim in combination with a carriage, L, that supports the bed, O, and that vibrates in the arc of a circle, a jointed scraper, c', that is actuated in a line radial to that arc, substantially as described.

Also raising and lowering the bed, O, by means of screws and worm gears or thin equivalents, substantially as set forth for the purpose specified.

Also the removable cams, h', the form of which is made to correspond with the surface of the stone or zinc, whether it be curved or flat for the purpose of pressing the scraper uniformly on to the stone during its traverse; and of such a width of bearing surface that the scraper will be held down a length of time corresponding to the length of the stone, substantially as set forth.

Also the revolving tympans, J K, and nippers, h, in combination with the rolls, G H I, when said tympans serve the purpose and are used in lieu of a roller or platen, and operating substantially as set forth for the purpose specified.

Also revolving the tympans which move under the heavy pressure of a scraper, and are used without a roller or platen to give pressure by means of chains and sprocket wheels, substantially as set forth.

Also the method substantially as described of combining and attaching the tympans and nippers to, and operating them by means of, he chains, e, for the purpose set forth.

Also the employment of two or more revolving tympans when used without a roller or platen to give pressure, and two or more sets of nippers, as set forth for the purpose described.

Also disengaging the printed sheet from the nippers at such a time during the revolution of the tympan, that it will fall printed side up on to the receiving table, in the manner substantially as set forth.

Also the swinging receiving table, z, with its inclined plate, C', in combination with the frame, A', for the purpose of laying the printed sheets one on the top of the other, substantially as described.

Also the endless band, D', in combination with the rolls, s t x, and trough, r, for the purpose of damping the stone or zinc, substantially as set forth.

Also the grease box, B', for the purpose of lubricating the interior surface of the tympans, substantially as described.

Also the distributing tables, V and V, in combination with the ink-distributing cylinder, T, and ink rolls, y, for the purpose of evaporating the superfluous moisture absorbed by the ink, substantially as set forth.

### 42,126.—Pump for Bored Wells.—James Suggett, Cortland, N. Y.:

I claim the perforated pipe, a, with the pointed end, b, constructed as a drill and united with a pump, all substantially as shown and described.

### 42,127.—Machine for preparing Cotton, &c., for Spinning.—Jacob Taylor, Oldham, England. British Patent dated May 26, 1862:

I claim, first, The arrangement and combination of straight, movable, adjustable knives or combs, having V shaped teeth, with the blocks, k, the roller, e, and the eccentric seats, l, substantially as and for the purpose set forth.

Second, The combination of an angular or other shaped bar, s, with the coffer, b, and the revolving combs or knives, in the manner described and for the purpose set forth.

Third, The combination of adjustable stop pieces, a' and e', with each end of the loose knives or combs, in the manner described and for the purpose set forth.

Fourth, The application of an elastic band, or its equivalent, for the purposes and in the manner set forth.

### 42,128.—Pump.—William H. Thomas, Sacramento, Cal.:

I claim the vent or tube, b, fitted in the pipe, D, or at the bend of a siphon shaped suction pipe of a pump, in connection with a plug or stopper, c, attached to an arm, I, provided with a float, g, and fitted within a chamber, H, communicating with the pump-cylinder, A, or the cylinder pipe through which the water is discharged, all arranged to operate substantially as and for the purpose specified.

I further claim the relative arrangements of the air chamber, F, valves, C and G, and pump cylinder, A, substantially as herein shown and described.

[This invention has for its object the keeping of a pump always charged with water after having once been put in operation, thereby obviating the trouble attending the starting of a pump which has become empty on account of leaky or defective valves.]

### 42,129.—Mechanism for operating Churns.—George True, Funchal, Madeira:

I claim, first, The barrel, G, hung upon pivots, g, in a rotary hoop, E, in combination with the toothed racks, D D', sliding carriages, C C', and suitable gear wheels and pinions, all constructed and operating in the manner and for the purpose substantially as described.

Second, The sliding pinion, e*, in combination with the gear wheels, c d e, rack, D', sliding carriage, C', and barrel, G, constructed and operating substantially as and for the purpose set forth.

Third, The application of the segmental flanges, h, to the heads of the barrel, G, when the latter is hung upon pivots, g, in the rotary hoop, E, substantially as and for the purpose specified.

[The object of this invention is to arrange a barrel-churn in such a manner that the churning will be accomplished by the action of the gravity of the barrel and its contents, and of a fly-wheel and a series of gear wheels, whereby the velocity of the descending barrel is regulated. Mr. George True was the late American Consul at Funchal, Madeira, and since the above application was made for a patent he has died very suddenly. The invention referred to above is very novel, and we think useful; and for further information address Mr. John True, the father of the deceased, at Mount Vernon, Ohio.]

### 42,130.—Washing Machine.—Marshall Turley, Council Bluffs, Iowa:

I claim the pounder, C, with an oval head, b, and suspended by means of a pivot, d, from the hand lever, D, in combination with the brackets, E, socket, e, strap, f, and spring, g, constructed and operating in the manner and for the purpose substantially as herein shown and described.

[This invention relates to an improvement in that class of washing-machines in which the operation of washing is effected by the action of a pounder, which is placed in an ordinary wash-tub, with a corrugated or slatted bottom, and to which a reciprocating motion is imparted by a hand lever.]

### 42,131.—Brush.—Charles Twyford, Red Bank, N. J.:

I claim a whitewash, varnish, or other similar flat brush, constructed by having the bristles, B, fitted or placed within a metallic band, A, and secured therein by means of a wire, a, passing through the bristles, and the perforations, b, in the band and covered with shellac, c, the wooden handle, D, being secured in the band, A, as shown, and all arranged substantially as and for the purpose set forth.

[This invention relates to a new and useful improvement in the construction of whitewash, varnish, and other brushes of flat form. The invention consists in inserting the buts of the bristles in a band of sheet-metal, and securing the same therein by means of a copper or other metal wire, which passes transversely through perforations in the metal band and the bristles, and the ends of the bristles within the metal band are covered with shellac, and the wooden handle is fitted in the metal band and secured therein by transverse rods headed or riveted at their ends; the lower edges of the band being then upward so as to cover the wire which passes through the metal band and bristles.]

### 42,132.—Attachment to Fanning-mill Shakers.—Joseph Van Houten, Mount Morris, N. Y.:

I claim the employment of the attachment, D, constructed, arranged, and operating substantially in the manner and for the purposes described, in combination with the shaker, C.

### 42,133.—Knife-cleaner.—J. H. Van Riper, New York City:

I claim an instrument or device for cleaning knives, composed of a box provided at two opposite sides or points with guides to receive a reciprocating rubber bar, and provided with recesses at its other two sides or at two opposite points which are in a plane at right angles or thereabouts with the plane of the guides, to admit of the knife blade being passed under the rubber of the reciprocating bar at right angles, or nearly so, with the latter, substantially as set forth.

[This invention was illustrated on page 168 of the present volume of the Scientific American.]

### 42,134.—Album Clip.—Charles Weil, New York City:

I claim the combination of two blades or thin and smooth pieces of iron, steel, or bone, or other suitable material, in the manner above described, for the purpose of inserting a card portrait or picture into paper, paste-board, or other frail frames of the nature and kind generally used for albums.

### 42,135.—Device for destroying Vermin and Insects.—David H. Wood, Sandusky, N. Y.:

I claim the combination and arrangement of the steam chamber, A, heater, J, and pipe, G, when the parts are constructed as shown and described, and for the purposes set forth.

### 42,136.—Machine for ornamenting Leather.—C. T. Woodman, Boston, Mass.:

I claim, first, Boarding or pebbling skins or leather by means of a single short cylinder rolling over a table, with the requisite pressure, substantially as described.

Second, I also claim raising and lowering the table, A, by means of the toggles, Q, arm, S, spring, U, arm, T, and cam, P, or their equivalent, substantially as set forth and for the purpose described.

### 42,137.—Signal Whistle.—Thaddeus C. Banks (assignor to himself and Samuel A. Banks), New York City:

I claim constructing a signal whistle of more than one pipe or barrel, but each combined with a common mouth-piece, in the manner and for the purpose substantially as set forth.

### 42,138.—Bailed Hollow-ware.—John B. Crowley (assignor to Chamberlain & Co.), Cincinnati, Ohio:

As a new article of manufacture, I claim a pot or kettle, A, having bail ears of the form, B B' C D E E', constructed and operating in the manner set forth.

### 42,139.—Breech-loading Fire arm.—Cyrus B. Holden (assignor to himself and S. H. Bowker), Worcester, Mass.:

I claim, first, The breech-piece, D, and brace-lever, E, combined with each other and with the frame of the arm, substantially as herein specified.

Second, The two pins, p q, one applied to slide in the brace-lever, E, and the other to slide through the breech-piece, D, and the two combined to operate substantially as herein described.

[This invention consists principally in a certain novel mode of applying the movable breech-piece of a breech-loading fire-arm, whereby simplicity of construction, convenience for loading, and a firm support for the breech-piece in firing are obtained.]

### 42,140.—Double Phosphate of Lime and Soda for Culinary and other Purposes.—E. N. Horsford, Cambridge, Mass., assignor to John H. Cheever, New York City:

I claim the double phosphate of lime and soda of the composition and preparation substantially as above described, for the uses above set forth.

### 42,141.—Copying Press.—Francis Hovey (assignor to E. W. Frost), New York City:

I claim the combination of the following elements, to wit: the plate, E, and socket, D, cast in one piece, the screw, C, formed with a journal, c d, and groove, a, and the soft metal filling, b, introduced through an aperture, f, into the chamber, e, of the socket, D, all as herein specified and for the purposes explained.

### 42,142.—Army or Train Wagon.—Arthur Little (assignor to Busby, Little & Co.), Wheeling, West Va.:

I claim the combination of adjustable racks with a wagon, arranged and applied to operate substantially in the manner as and for the purpose herein set forth.

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42,143.—Glass-pressing Machine.—Frederick McKee & Charles Bullinger (assignors to McKee & Brothers), Pittsburgh, Pa.:

We claim, first, Operating the piston of a plunger in glass-pressing, by the application of steam applied in the line of the piston or plunger, substantially as described.

Second, We claim the separation between the plunger rod and the piston rod, so that the latter may, after forcing down the plunger, raise up, whilst the plunger remains momentarily down, for the purpose and substantially in the manner described.

Third, We claim the combination of the overpoise lever, H, with the pressing mechanism, for carrying up said mechanism, after the piston rod has ascended, substantially as described.

Fourth, We claim in combination with the piston and plunger rods, the spring jaw-levers, a c, and rod, e, with its attachment to the arm, h, for the purpose of working the valves of the steam cylinder, substantially as described.

42,144.—Stove.—Edward Mingay, Boston, Mass., assignor to Lemuel M. Leonard, Taunton, Mass.:

I claim my improved arrangement of air valve, b, seat, a, opening, g, and conduit, B, together, and with respect to a smoke-pipe, A, or flue, and so as to operate therewith, substantially as described.

42,145.—Apparatus for the Manufacture of Vinegar.—Samuel Myers (assignor to himself and George W. Early), Chicago, Ill.:

I claim, first, The arrangement of triangular ledges or projections, a, on the inner sides of the filling tanks, B, substantially as and for the purpose specified.

Second, The application of doors, d, to the air chambers, C, as and for the purposes set forth.

Third, I claim the combination of the strips, a a a, and cords or strips, e e e, with a vertical series of tanks and chambers, B C B C, as herein shown and described.

[This invention relates to an apparatus for making vinegar, in which a pile of tanks are used on the top of the other to the hight of 50 or more feet, so that the acidification of the alcohol, high wine, or other liquid, will take place as the same descends from the top or upper tank of the pile to its bottom.]

42,146.—Punching Machine.—Joseph F. Sargent & Elmer Townsend (assignors to said Elmer Townsend), Boston, Mass.:

We claim constructing a punching machine so that its punches may be adjusted in any direction in their plane of action, substantially as described.

Also working the movable bed with reference to fixed punches, by means of slide, l, and levers, r q and b, operating together as described.

42,147.—Manufacture of Bar Links.—George H. Sellers (assignor to the Phœnix Iron Company), Phœnixville, Pa.:

I claim the making of links from rolled bars, without welding on the enlarged portions, viz: by upsetting the iron at each end of the bar by and within suitable formers, and so that the sectional area of said ends, through the center of the pin holes, shall equal the area of the center of the bar, substantially as and for the purpose described.

42,148.—Harvester.—John H. Snyder, Killbuck, Ill., assignor to Nelson Bigalow, Scott, Ill.:

I claim the arrangement of the cutting apparatus, apron, raker, and frame, G, with the V shaped adjusting lever, E, and frame, A, in the manner herein shown and described.

I also claim the combination of the spring flap, k, with the rake, J, and box, I, all constructed, arranged, and operating in the manner herein shown and described.

[This invention relates to a new and improved device for cutting standing grain and raking the same into gavels which are discharged from one side of the machine. The invention being also applicable to the loading of grain by a very simple adjustment.]

42,149.—Sewing Machine.—Henry T. Stains, Scottsville, Pa., assignor to Robert Baird, Shirleysburg, Pa.:

I claim the employment or use of a standard, A, and sc ew-clamp, D, in combination with a vertically adjustable table, F, and with the ned-plate of a stitching device, all constructed and operating substantially as and for the purpose herein shown and described,

[The object of this invention is a device capable of holding stationary the stitching device of Henry Hudson, patented Nov. 1st, 1859, or any other similar stitching device, in proper position over an adjustable table in such a manner that said stitching device can be used as a stationary sewing machine.]

42,150.—Chair-seat.—Robert Wood, West Troy, N. Y., assignor to Henry I. Seymour, Troy, N. Y.:

I claim chairs containing seats or backs, made substantially as described, as a new article of manufacture.

## RE-ISSUES.

1,641.—Operating Ordnance.—James B. Eads, St. Louis, Mo., assignee by mesne-assignments of Mills L. Callender, New York City, and N. W. Northrup, Greene, N. Y. Patented March 17, 1863:

I claim so combining a revolving tower and gun, with a revolving steam cylinder or piston as that they may be raised and lowered vertically by steam, whilst they are capable also of being turned horizontally together, substantially in the manner described.

1,642.—Operating Ordnance.—James B. Eads, St. Louis, Mo., assignee by mesne-assignments of Mills L. Collender, New York City, and N. W. Northrup, Greene, N. Y. Patented March 17, 1863.

I claim, first, The movement of a gun by steam, or its equivalent, back and forth on a line with the axis of the gun, and the taking-up of the recoil and counter-recoil of the gun by steam, or its equivalent.

Second, Also taking the recoil and counter-recoil of the gun upon a cushion of steam in the cylinder or cylinders, which are so connected in the gun as to raise and lower with it, substantially as described.

1,643.—Operating Ordnance.—James B. Eads, St. Louis, Mo., assignee by mesne-assignments of Mills L. Callender, New York City, and N. W. Northrup, Greene, N. Y. Patented March 17, 1863:

I claim sustaining a gun upon a column of steam, upon which column the gun may be turned horizontally to bring it to bear upon any object, substantially as described.

1,644.—Operating Ordnance.—James B. Eads, St. Louis, Mo., assignee by mesne-assignments of Mills L. Callender, New York City, and N. W. Northrup, Greene, N. Y. Patented March 17, 1863:

I claim so combing a gun with a vertical and horizontal steam cylinder or cylinders, as that the gun may be moved by steam vertically or horizontally at different times, or both vertically and horizontally at the same time, substantially as described.

1,645.—Mode of attaching Knobs to Spindles.—John E. Parker & Henry J. P. Whipple, West Meriden, Conn., assignees of G. N. Cummings, Meriden, Conn. Patented July 22, 1862:

We claim combining the knob with a threaded spindle by means of on independent piece of metal which embraces the spindle at its square portion, and engages with the end of the shank of the knob, substantially in the manner and for the purposes set forth herein.

1,646.—Shirt Collar.—Solomon S. Gray, Boston, Mass. Patented June 23, 1863:

I claim, first, The turning over of a paper, or of a paper and cloth collar, by a defined line, whether pressed into the material by a die or pointed instrument, or by bending it over the edge of a pattern or block, of the proper curve or line, substantially as described.

Second, I also claim turning the part, B, of a paper or a paper and cloth collar over on to or towards the part, A, in a curved or regular line, instead of a straight line, substantially as and for the purpose described.

Third, I also claim so turning over the part, B, on to or towards the part, A, in the manner above described, as that a space shall be left between the two parts, for the purpose, and substantially in the manner herein described.

1,647.—Mode of treating Oils and Fats, for rendering them more useful for burning in Lamps, lubricating Machinery, and for other Purposes.—Sylvester Lewis, Rochester, N. Y. Patented June 10, 1862:

I claim the treatment of oils and fats by the use of benzole, benzine, or naphtha, either with or without annotto combined, substantially in the manner and for the purpose described.

1,648.—Straw-cutter.—H. K. Parsons (assignee through mesne-assignments of Jacob H. Mumma), Harrisburg, Pa. Patented Jan. 26, 1858. Re-issued Sept. 6, 1859:

I claim, first, A knife constructed in the form of a spiral segment of a cylinder, and so that when it is applied to supports, heads, arms, or holders, its entire outer surface will, if intersected transversely at any point, form the arc or segment of a circle concentric with the axis about which it revolves, in contra-distinction to a tangentially arranged knife and other knives which in being sharpened are reduced so as no longer to cut in the same path or circle, substantially as described.

Second, A reversable spiral knife with two under bevelled cutting edges, and constructed with its outer surface concentric with its axis of motion, and adapted for use, substantially as described.

Third, The combined application to straw-cutting machines of a changeable feed gear with two edged revolving cutters or blades, when so made that they shall bring a different cutting edge into action, or when run in either direction they shall always feed in the material in one and the same direction, substantially as and for the purpose stated.

Fourth, The combination of the feed rollers, acted upon by tappets, and the crushing rolls controlled by gum elastic springs, when arranged in reiption to, and acting in connection with, the cutting apparatus, as herein described.

## DESIGN.

1,926.—Design for a Thread-spool.—Lawson C. Ives, Hartford, Conn.

## EXTENSIONS.

Compound Hard and Soft Metal Packing.—Andrew Fulton, Pittsburgh, Pa. Patented March 26, 1850:

I claim the compound metallic packing ring constructed of hard and soft metals, substantially as herein set forth, the hard rings being for the purpose of preventing the substance of the softer from squeezing out around the follower and flange of the piston.

Attachment of the Forge-hammer to its Helve.—Daniel Hicks, Duncansville, Pa. Patented April 2, 1850:

I claim limiting the depth of that portion of the hole in the helve which receives the shank of the hammer, and at the same time making the crown. A', solid, excepting a hole of sufficient size through the same to admit of a punch, substantially in the manner and for the purpos herein described.

Cat-head and Shank-painter Stopper.—Charles Perley, New York City. Patented April 2, 1850:

I claim the application of the lock piece, g, with the wedge or lug, 7, to act in the mortise, 3, to hold the link, d, on the lug, e, when put down for that purpose; or let the anchor "go," by raising it, without the intervention of any other moving part; such lock piece, g, and lug or wedge, 7, being constructed or combined, and operating with the other parts, substantially in the manner and with the effects described and shown.

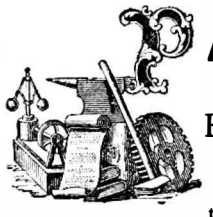
Surface Condenser for Steam Engines.—Joseph P. Pirsson, New York City. Patented April 2, 1850. Re-issued Aug. 10, 1858:

I claim, first, So enclosing the condensing surfaces of a surface condenser, within a tank which is constructed to be capable of acting as a jet-condenser, that when the said surface condenser shall become deranged by leaks or otherwise, resort may be had to the jet-condenser, whereby condensation may be continued, and the vacuum maintained, substantially as set forth.

Second, The combination of a surface-condenser with a box or case, in such a manner that the condensation of the steam shall be effected therein without subjecting the said surface condenser to atmospheric pressure, substantially in the manner described.

Third, The aperture, w, or its equivalent, for maintaining the vacuum and as a passage for any steam which may remain uncondensed in the radiating condenser as set forth.

Fourth, Connecting the evaporator with the chamber, h, substantially in the manner described, whereby the saturated water can be drawn off from the bottom of the evaporator.

# PATENTS

GRANTED

FOR SEVENTEEN YEARS!

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three last ex-Commissioners of Patents:—

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter:

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D. BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F. and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows:—

| | |
|---|---|
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| On filing each application for a Patent, except for a design | $15 |
| On issuing each original Patent | $20 |
| On appeal to Commissioner of Patents | $20 |
| On application for Re-issue | $30 |
| On application for extension of Patent | $50 |
| On granting the Extension | $50 |
| On filing a Disclaimer | $10 |
| On filing application for Design (three and a half years) | $10 |
| On filing application for Design (seven years) | $15 |
| On filing application for Design (fourteen years) | $30 |

The Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row New York.

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort at extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

Patents may be extended and preliminary advice obtained, by consulting or writing to MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject, giving a brief history of the case, inclosing the official letters, &c.

FOREIGN PATENTS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They think they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does not


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limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO'S Agency, the requirements of different Government Patent Offices, &c., may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

COPIES OF PATENT CLAIMS.

MESSRS. MUNN & CO., having access to all the patents granted since the rebuilding of the Patent Office, after the fire of 1836, can furnish the claims of any patent granted since that date, for $1.

THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row New York.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the Rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York

## Notes and Queries

**L. H. N., of N. J.**—To charge a piece of steel with magnetism by means of a horse-shoe magnet, place one end of the magnet on the middle of the bar and draw it to the end of the bar, and repeat the stroke several times always in the same direction. Then place the other end of the magnet on the middle of the bar and draw to the opposite end of the bar, repeating the stroke as before. You can get your old magnet renewed at Charles T. & J. N. Chester's, 104 Center street, this city.

**H. H. A., of Vt.**—You will find the latest information in regard to the tannin process in the "Camera and the Pencil," by M. A. Root, published by J. Alvord & Co., New York. The process is this—after the plate comes from the bath pour over it a solution of tannin 15 grains to the ounce of water, and dry it.

**E., of Md.**—Both light and heat can be produced of greater intensity by the electric current than by the oxyhydrogen blow-pipe. Fusion is the same as melting.

**H., of Maine.**—The most approved enamel for iron-ware is pulverized glass, and as glass is one of the most permanent compounds known, it is not probable that the oxide of lead or any other poisonous ingredient would be set free by any substance employed in domestic economy.

**A. F. O., of N. Y.**—The great aim of astronomers is accuracy in their observations. Large sums of money and years of labor are expended in measuring angles one or two seconds more nearly correct than had been done before. If you have any improved plan for graduating instruments it will be appreciated. You can see what has already been done by calling at the Dudley Observatory.

**J. B. H., of R. I.**—Your method of testing boilers through the expansion of water by heat is very old and has been described in the SCIENTIFIC AMERICAN many times. It is a very good and safe way, and we shall publish your letter in order to revive the subject.

**C. F. C., of Pa.**—Address Henry Carey Baird, 406 Walnut street, Philadelphia, for a work on steam power.

**C. C. W., of N. Y.**—By writing to Cope & Co., Cincinnati, Ohio, we think you will get the information you desire about the index-plate.

**J. S. R., of Conn.**—You will find an editorial article entitled "Water as Fuel," in No. 14, of the present volume, which will give you the information you desire.

**J. F. C., of Canada.**—We discover nothing new in your ordnance and projectiles.

**D. D. G., of Wis.**—We cannot advise you to have an engraving of your invention published until after the patent is allowed. When the patent is granted, then will be the time to give it publicity.

## Money Received.

At the Scientific American Office, on account of Patent Office business, from Wednesday, March 30, 1864, to Wednesday April 6, 1864 :—

M. N., of N. Y., $25; W. S., of N. Y., $25; E. D. S., of Mass., $25; J. M., of N. Y., $41; D. R., of R. I., $45; H. B., of Conn., $20; Z. A., of R. I., $100; I. L., of N. Y., $20; C. A. C., of Pa., $200; E. & B., of N. Y., $16; R. B. & Co., of N. Y., $100; E. S., of N. Y., $16; C. F. T., of N. Y., $41; T. S. M., of Ohio, $20; G. S., of Pa., $20; J. M., of N. Y., $41; T. R., of N. Y., $20; J. S., of Mo., $20; B. M., of N. Y., $16; A. S., of Iowa, $20; A. G., of N. Y., $20; R. A. V., of N. Y., $31; R. H. R., of N. Y., $20; F. M., of Canada, $20; T. W. W., of Ill., $20; J. R. P., of Conn., $45; P. B., of N. Y., $20; J. P. C., of N. Y., $16; A. McP., of N. J., $36; H. W. G., of N. Y., $20; A. K., of Ill., $25; G. F. H., of Minn., $28; H. B., of N. Y., $28; J. McK., of Ohio, $16; J. S. T., of Pa., $25; R. W., of N. Y., $41; J. H. B., of N. J., $16; W. A. H., of Ind., $16; S. S., of N. Y., $25; J. A., of Wis., $25; J. S., of Iowa, $20; W. W. W., of Mich., $15; J. A., of Ill., $28; S. & I., of Iowa, $25; C. M., of N. Y., $16; S. R. H., of Mich., $16; L. J., of Conn., $25; A. R. S., of Pa., $35; J. G. C., of N. J., $16; J. T. M., of Ill., $16; S. K. K of Pa., $25; H. B. W., of Iowa, $16; J. W. O., of Ill., $26; J. R. A., of R. I., $15; J. L. W., of N. Y., $16; A. R., of Iowa, $16; P. L. S., of Pa., $16; J. F., of Conn., $25; L. B., of La., $16; A. G. T., of Ill., $21; H. P., of Vt., $25; H. W., of N. Y., $16; D. H. B. A., of Vt., $25; C. M. M., of N. J., $40; W. F., of Conn., $25; A. H. S., of N. Y., $15; R. B., of N. Y., $22; H. B., of N. Y., $16; J. B. H., of N. Y., $22; G. S., of Maine, $16; O. E. W., of Pa., $26; J. G. C., of N. Y., $25; J. M., of N. Y., $25; J. A. B., of — $10; K. & S., of N. Y., $25; J. G., of Md., $22; J. L. R., of Ohio, $16; W. H. P., of Mass., $10; G. F. B., of Mass., $25; and a check for $20 on Hackettstown Bank, signed Caleb Swayze, which was received in an envelope without any letter of instructions. Who is the sender?—what is it for?

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, stating the amount and how it was sent, whether by mail or express.

## Specifications and drawings and models belonging to

parties with the following initials have been forwarded to the Patent Office, from Wednesday, March 30, 1864, to Wednesday, April 6, 1864 :—

M. N., of N. Y.; W. S., of N. Y.; E. D. S., of Mass.; C. F. T., of N. Y.; A. W., of N. Y.; J. M., of N. Y.; S. & K., of Prussia; R. S. & R., of Nebraska; N. S. W., of Conn.; H. B., of N. ..; G. F. H., of Minn.; L. D. C., of Mich.; A. K., of Ill.; D. M., of Mass.; D. E. H., of N. T.; J. A., of Wis.; L. J., of Conn.; J. A., of M..; S. & I., of Iowa; H. A., of Pa.; J. S. T., of Pa.; S. S., of N. Y.; J. W. O., of Ill.; A. R. S., of Pa.; H. P., of Vt.; S. S., of N. H.; A. G. P., of Ill.; J. H., of N. Y.; D. H. B. A., of Vt.; K. & S., of N. Y.; J. B., of Mass.; G. F. B., of Mass.; W. F., of Conn.; O. A. K., of R. I.; A. J. T., of Ohio; W. L. of Md.; J. G. C., of N. J.


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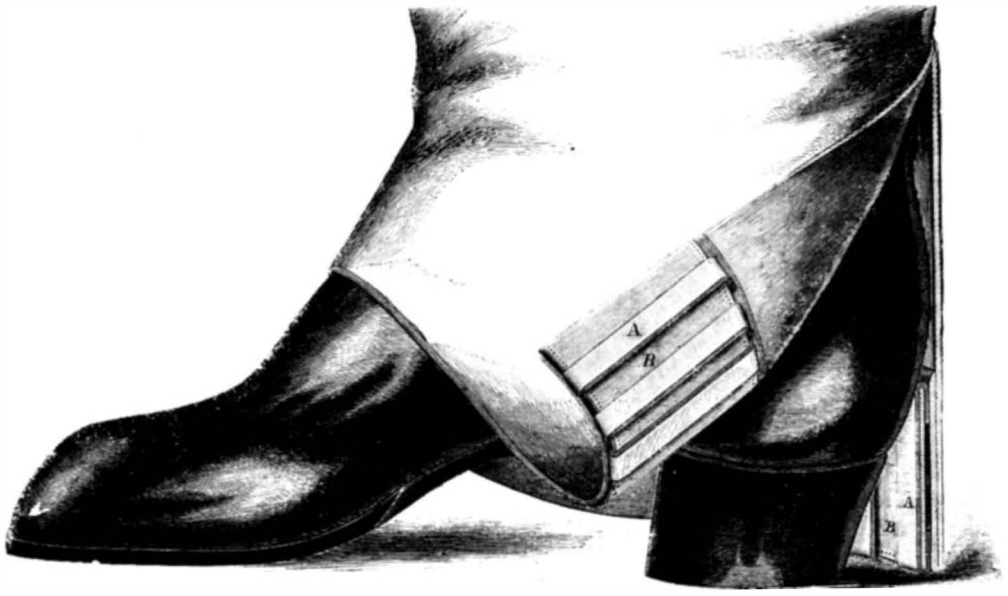
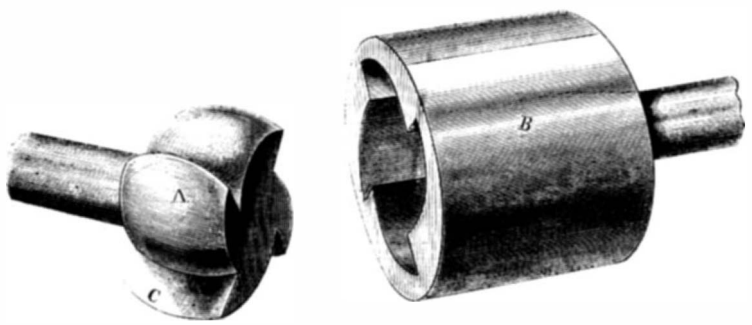



HEATON'S PANTALOONS PROTECTOR.

device itself consists of a light and strong metallic guard, A, which has two hooked ends; these ends are slipped over the cloth strip, B, and a slight blow of a small hammer, or even simple pressure, will drive them into the cloth so that they hold securely without further fastening. These strips extend only around the back and sides of the pantaloons, and while they prevent the cloth from rapid wear, also give a stiffness which prevents the pants from getting under the heel, and make the garment set better. A patent is now pending on this nvention. For further information address the inventor, C. W. S. Heaton, 37 Park Row [room No. 9], New York.

### Improved Knuckle-Joint.

A great many very terrible accidents are continually occurring from the carelessness of persons in working about machinery. Of these accidents the tumbling shaft coupling or universal joint, used in threshing and other machines, has been a fruitful source, and it is but a short time since we chronicled several casu-




TAYLOR'S KNUCKLE-JOINT.

alties resulting from its use. It is a perfectly simple thing to make this detail of machinery in such a manner that while it is quite as efficient, it is also safe, and the operator, whether man, woman, or child, can feel entirely safe, even though their garments swing directly over it. The engraving published herewith shows the improved knuckle-joint or coupling, and its construction is so plain as to require little description from us. The part, A, slips into the shell, B, and by reason of its curved surfaces may be moved through any angle, while the wings or flanges, C, cause the shaft to which it is attached to revolve as usual. The shell, B, is straight inside and out, and the plain exterior is a perfect protection against accidental injury. This device is the invention of S. N. Taylor, and a patent was granted to him through the Scientific American Patent Agency, Feb. 16th, 1864. For further information address the inventor at Horicon, Wis.

### Regulating and Controlling Clocks by Electricity.

The directors of the Glasgow Exchange have decided upon taking immediate steps for introducing into the Exchange the system of controlling clocks by electricity, which has been recently established in this city, in connection with the observatory of the Glasgow University. A wire extending from the observatory to the College being already attached to the building of the Exchange, the clocks of the latter may be connected with the system at a trifling expense. It is proposed to place under control the great public clock and the clock in the interior, which is above the entrance into the building. A conspicuous clock, in place of the present small clock, showing the time to seconds, will also be fitted up in the great room, and will be similarly placed under control. This clock will furnish an interesting test of the exactitude of the method of control, inasmuch as the jump of the seconds hand at the sixtieth minute, corresponding to each successive hour, must invariably coincide with the first blow of the hammer on the bell of the turret clock. This result has been verified in the most satisfactory manner at the College, where a controlled seconds clock in Professor William Thomson's class room may be seen to beat in perfect unison with the great clock in the tower of the building. At the thirtieth second of each minute, a no-current signal is transmitted from the Observatory clock, which is indicated by the needle of a galvanometer placed in the circuit standing still for an instant. This circumstance furnishes a ready means of testing the coincidence of the controlled clock with the standard clock, for if a galvanometer be placed in the circuit beside the controlled clock, the needle—which alternately oscillates from side to side—will be observed to come to a momentary standstill at the thirtieth second of each minute, provided the control be perfect.—*London Engineer.*

HAILSTONES sometimes fall with a velocity of 113 feet in a second, and rain at 43 feet in a second.

### Mr. Peabody's Gift.

The first of the buildings which has been erected by the committee, to whom the disposal of Mr. Peabody's munificent gift to the city of London was referred, will be ready for occupation in the course of the present month. The building, which has cost £22,000, is situated at Bethnal-green. The applications for rooms have far outstripped the means of the committee to supply them, and some difficulty has been experienced in making a selection out of the number. There is every expectation that the speculation will be most successful, as the building has been formed with the view of affording the utmost accomodation to the occupants. Rooms have been constructed of the dimensions of 12 feet by fifteen feet 6 inches, a sufficient size for a small family. There are rooms of a smaller size, and some for single men. There are also shops on the basement floor with suites of rooms adjoining, and which it is believed can be let at a rental of about £60 a year. The domestic comforts of the inmates have been carefully studied. There are separate lavatories for the men and for the women and children, a plentiful supply of water, and excellent ventilation. The rent charged for the rooms will be from 2s. to 3s. and 5s. a week.

THE

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## FOR 1864!

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